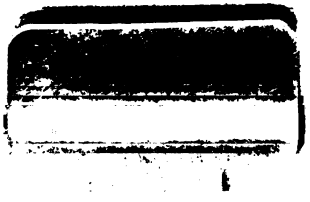

RAILWAY RATES

AND

TERMINAL CHARGES.

BY

R. PRICE-WILLIAMS, M.Inst. C.E.

9, ADELPHI TERRACE, STRAND, LONDON, W.C.

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RAILWAY RATES *and* TERMINAL CHARGES.

By R. PRICE-WILLIAMS, M.INST. C.E.

[Read before the Royal Statistical Society, 16th June, 1896.
SIR COURTENAY BOYLE, K.C.B., Vice-President, in the Chair.]

THE necessity for readjustments of the maximum rates and charges, more especially those relating to the merchandise traffic, of the principal railway companies in this country, for the most part based on tariffs sanctioned by Acts of Parlianent passed in the early days of railways, has long been recognised, and an effort has recently been made to accomplish this under the provisions of "The Railway Rates and Charges Order Confirmation Acts of "1891 and 1892," the maximum rates and charges sanctioned by previous Acts being considerably modified. It is anticipated that besides greatly simplifying the railway tariffs, and rendering them more in harmony with the requirements of the time, these recent changes in railway rates and charges may have the effect of stimulating the trade of this country, and tend to put an end to the long period of depression which has been experienced in this, as in most other countries. Sufficient time, however, has not elapsed to admit of any reliable opinion being formed as to their effect in this respect.

Before dealing with the question of the relation which the actual cost of conveyance and the station and service terminal expenses bear to the new rates and charges for these services, authorised by the recent Acts, it is necessary briefly to refer to the method by which the railway working expenses have been apportioned to the different classes of traffic.

Railway Working Expenses.

It has been asserted that the published reports of the railway companies do not afford the means of separately determining the expenses attributable to the passenger, goods, and mineral traffic, and it must be admitted that so far as regards many of the principal English railway companies there is some foundation for this assertion, inasmuch as they are not required by the Board of Trade and do not afford the necessary information.

It fortunately happens, however, that as regards the "Traffic "Expenses," one of the main items of railway expenditure, which under the head of "Coaching and Merchandise "Expenses" constitutes considerably more than a third of the

entire working expenses of a railway, the published reports of the London and North Western Railway Company continued, for the long period of twenty-five years (1860 to 1885), to give these expenses separately, and have thus not only afforded the means of correctly apportioning the working expenses of that railway, but of the other principal railways whose reports do not furnish the information, as during this long period the ratios of the coaching to the merchandise expenses have remained almost constant, and what is of still more importance they, as might be expected, so closely approximate to the ratios of the coaching and merchandise receipts, that the latter may be safely adopted in the apportionment of the traffic expenses of the other principal railways.

Details of the method of apportionment of the working expenses, as applied by the writer of the paper in the case of the London and North Western, and other principal railways in this country, are given in the Appendix, Table A. It may be mentioned that the accuracy of the method was admitted by the late Sir George Findlay in his admirable paper on "English "Railway Traffic," read at the International Railway Congress at Paris (Congrès International des Chemins de Fer, troisième session, Paris, 1889), which gives in a tabular form some of the results arrived at by this method in the case of the passenger traffic of the London and North Western Railway.

First Class Passenger Traffic. Working Expenses.

The great changes which have occurred of late years in the character of the passenger traffic in this country are so remarkable as to be well worthy of notice, more especially as regards the rapid decadence of the first and second class traffic, and the enormous development of the third class, to which reference was made by Sir George Findlay at Paris in 1889, and which has continued ever since.

It should be mentioned that up to the period of 1873 (when the Midland Company initiated the new departure in railway policy of carrying third class passengers by all express and fast trains, quickly followed in 1875 by the abolition, by that company, of their second class traffic, combined with the reduction of first class fares to the level of those hitherto charged for the second, immediately resulting in a corresponding reduction in the first class fares of all the other railways) the first class passenger traffic of the London and North Western, and in fact of most of the other principal English railways, continued to increase, and the revenue derived therefrom was fairly remunerative. The number of London and North Western first class passengers, for instance,

which in 1860 only amounted to 1,911,757, and yielded a gross revenue of considerably over half a million (594,956*l.*), equivalent to 6*s.* 2$\frac{3}{4}$*d.* per passenger, and nearly 1*s.* 8*d.* per train mile, in 1875 reached a maximum of 3,288,661 passengers, with a gross revenue of 729,647*l.*, which, although amounting to only 4*s.* 5$\frac{1}{4}$*d.* per passenger, and 11$\frac{3}{4}$*d.* per train mile, still left a profit of over 327,000*l.*, or just 35 per cent. of the gross receipts. (Table J, Appendix.)

The decadence of the London and North Western first class traffic, however, from the period of the great reduction of fares in 1875, has been exceedingly rapid and continuous, the number of passengers and annual gross receipts in 1894 being considerably less than in 1860, with this great difference, that whereas thirty-five years ago the first class working expenses amounted to only about 44$\frac{1}{2}$ per cent. of the gross receipts, and left the fair balance of profit already referred to, the working expenses in 1894, although apportioned in precisely the same way, approximate very closely to the gross revenue, only a nominal balance of profit of 59,533*l.* remaining out of a total gross revenue of 480,323*l.*[1]

There appears to be very little doubt that when in 1875 the Midland Company abolished its second class passenger traffic, and at the same time reduced its first class fares to the level of those hitherto charged for the second class, Sir James Allport fully anticipated that the effect of this large reduction in the first class fares would result in a more rapid development of the first class passenger traffic, which, although up to this time showing no signs of decrease, was always of slow growth.

It is needless to say these anticipations of Sir James Allport have never been realised; on the contrary, the result of the abolition of the Midland Company's second class passenger traffic, as experience has shown, has only led to the continued depletion of the first class carriages, a large number of the first and of those who hitherto had occupied the second class carriages preferring to travel more cheaply in the comfortable and well upholstered carriages of the third class. It is not a little remarkable to find that it is the Midland Company's first class passenger traffic—the company responsible for the general reduction of first class railway fares in this country—which has apparently suffered most from its effects; the number of its first class passengers, which in 1874 (the year preceding the reduction of fares) amounted to 1,204,377, and produced a gross revenue of 227,050*l.*, having in 1894 become reduced to 1,134,332 in numbers, and to 200,187*l.* in gross receipts; the working expenses attributable to this branch of passenger traffic (apportioned in the ratio of the number of carriages, as in the case of the London and North Western) exceeding the

[1] Table 5.

gross receipts in that year by as much as 111,091*l.*, entailing an annual loss of that amount to the company, equivalent to nearly 2*s.* (1*s.* 11½*d.*) per passenger and 1⅝*d.* per train mile. (Table 6.)

Second Class Passenger Traffic.

It is said that one of the causes which led to the Midland Company's abolishing their second class passenger traffic was the exceedingly rapid increase of the third class, resulting from running third class carriages by all trains, and the inadequacy of the third class carriage stock to meet the increased accommodation required; it is probable that this, coupled with the great exodus of first and second class passengers into the third class carriages, may have had something to do with it; however that may be, from that period down to the present time the decadence of the second class passenger traffic, more especially of the long journey traffic of the other principal railways north of the Thames, has continued at even a more rapid rate than in the case of the first class passenger traffic. The number of London and North Western second class passengers which in 1871 amounted to 8,281,000, and yielded a gross revenue of 867,099*l.*, or 2*s.* 1*d.* per passenger, decreased in 1875 to 7,017,000, and the gross revenue to 549,295*l.*, or to 1*s.* 6¾*d.* per passenger. Since then there has been a rapid and continuous decrease, both in the number of passengers and receipts, the number in 1894 being reduced to 2,928,939, and the gross receipts to 240,300*l.* Although the gross receipts per passenger in that year appear to have slightly increased to 1*s.* 7⅝*d.* per passenger, the working expenses attributable to the second class traffic, exceeded the gross receipts by so much as 77,518*l.*, representing a direct loss to the company of 6½*d.* per passenger and 0·86*d.* per train mile.[2]

Third Class Passenger Traffic.

That the radical changes in railway policy initiated by the Midland Company in 1873 and 1875, to which allusion has already been made, are mainly accountable for the present disorganised state and unremunerative character of the first and second class passenger traffic of the principal railways north of the Thames, there can be little doubt, but after all these minor evils (for which, no doubt, some adequate remedy will be found by the better adjustment of long journey fares and their closer approximation to those of the third class) count as nothing in comparison with the immense gain to the railway companies and to the public, resulting from the extraordinary development of the third class passenger traffic, which up to the period of these changes

[2] Table 5.

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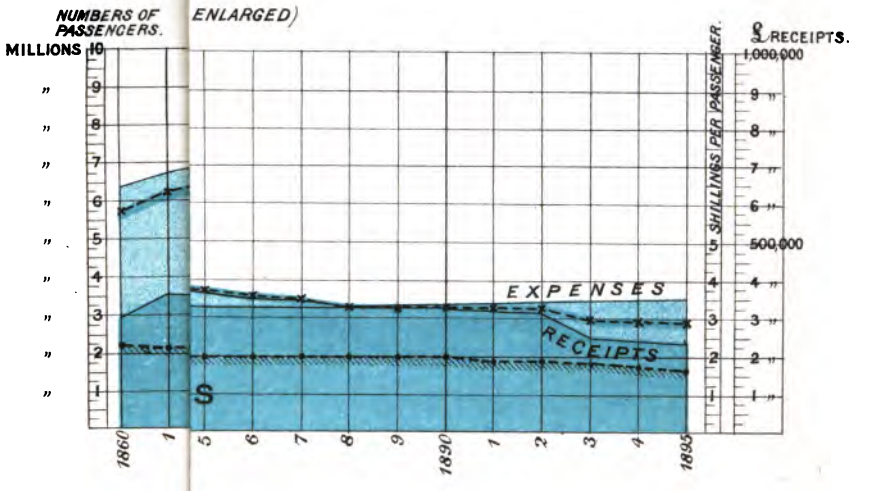

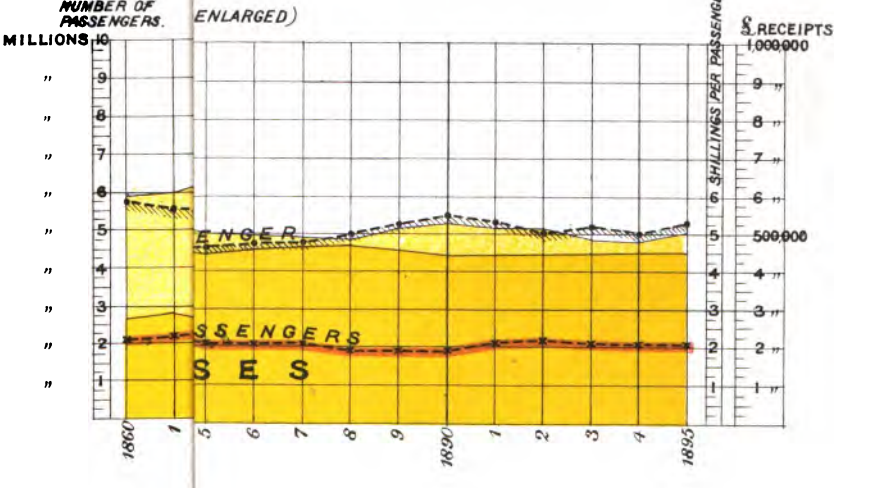

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constituted a relatively small portion of the revenue of the railways in this country, but which has since become the chief, if not the only profitable part of the passenger traffic.

The following figures, obtained from the Board of Trade returns, enable some idea to be formed of the completely altered character of the present passenger traffic, the rapid growth of the third class and of the decadence of the first and second class, during the period in question.

Railway Passenger Traffic, England and Wales.

TABLE 1.—NUMBER OF PASSENGERS.

[Board of Trade Returns.]

Classes.	1860.	Per-centage.	1872.*	Per-centage.	1875.†	Per-centage.	1894.	Per-centage.
First	16,889,022	12·31	32,015,513	8·60	37,136,435	8·23	24,307,559	3·02
Second	43,202,202	31·54	64,963,939	17·44	63,036,442	13·98	55,911,550	6·95
Third.....	76,897,680	56·15	275,470,771	73·96	350,859,764	77·79	723,920,899	90·03
All classes	136,958,904	100·00	372,450,223	100·00	451,032,641	100·00	804,140,008	100·00

TABLE 2.—RECEIPTS.

	£		£		£		£	
First	2,705,501	28·31	3,654,754	22·83	3,982,627	21·70	2,465,593	10·22
Second	3,514,799	36·79	3,669,736	22·93	3,293,358	17·94	1,694,515	7·03
Third.....	3,337,397	34·92	8,681,495	54·24	11,081,676	60·36	19,958,858	82·75
All classes	9,557,697	100·00	16,005,985	100·00	18,357,661	100·00	24,118,966	100·00

* Third class added to all trains.

† Abolition of second class and reduction of first class fares.

It will be noticed that the number of first class passengers, which had nearly doubled in the twelve years 1860 to 1872, and reached a maximum of over 37 millions in 1875 (the year which witnessed the reduction of first class fares and the abolition of the second class passenger traffic by the Midland), had declined in 1894 to roundly 24,300,000, and at present only constitutes 3 per cent. of the total number of passengers of all classes; while the first class receipts, which in 1875 reached a maximum of nearly 4 millions, have since dwindled down to less than $2\frac{1}{2}$ millions sterling.

Second Class Passenger Traffic.

The decrease, both as regards the number of, and gross receipts from, the second class passenger traffic has been still more remarkable; the former, which in 1860 constituted over $31\frac{1}{2}$ per cent., now representing only about 7 per cent. of the total number of all classes of passengers; while the receipts, which in 1860 amounted to as much as $36\frac{3}{4}$ per cent., have since become reduced to just 7 per cent. of the purely passenger traffic receipts of the railways in England and Wales.

Third Class Passenger Traffic.

As regards the third class passenger traffic generally, it is sufficient to draw attention to the significant fact disclosed by the figures in the preceding table, viz., that 90 per cent. of the passengers who travel by the railways in England and Wales are of this class, and that out of the 24 millions of the gross revenue the railway companies annually obtain from passenger traffic, nearly 83 per cent. (82·75 per cent.) is derived from this source; it may also be mentioned that the net revenue or profit derived from the third class is, as the results of the analyses of the working expenses of some of the principal railway companies show, so large as to more than compensate the loss at present sustained through the temporary falling off of the first and second class traffic.

The growth of the London and North Western and Midland Companies third class passenger traffic, as will be seen from the accompanying statement, has been exceptionally large and rapid, and it is only due to the first named company to draw attention to the remarkably rapid increase of 75 per cent. which occurred between 1860 and 1865, followed in the succeeding five years by a further increase of 43 per cent.; the immediate effect however of the general adoption, during the next five years, of the Midland policy of running third class carriages by all trains is conspicuously shown in the case of the Midland and North Western Railways, the number of third class passengers and the receipts therefrom having nearly doubled between 1870 and 1875.

TABLE 3.—*Third Class Passenger Traffic.*
LONDON AND NORTH WESTERN RAILWAY.

Year.	Number of Passengers.			Gross Receipts.		
	Number.	Increase.	Rate of Increase per Cent.	Gross Receipts.	Increase.	Rate of Increase per Cent.
				£	£	
1860	7,466,546	—	—	506,055	—	—
'65	13,026,330	5,559,784	74·46	702,322	196,317	38·80
'70	18,670,800	5,644,470	43·34	896,120	193,798	27·59
'75	33,810,762	15,139,962	81·09	1,762,875	866,755	96·73
'80	40,608,296	6,797,534	20·10	1,943,764	180,889	10·26
'85	48,070,861	7,462,565	18·38	2,267,175	323,411	16·64
'90	57,648,913	9,578,052	19·93	2,730,397	463,222	20·43
'95	66,680,532	9,031,619	15·67	2,969,308	238,911	8·75
Total increase	—	59,213,986	793·07	—	2,463,303	486·51
Average annual rate	—	—	13·69	—	—	5·19

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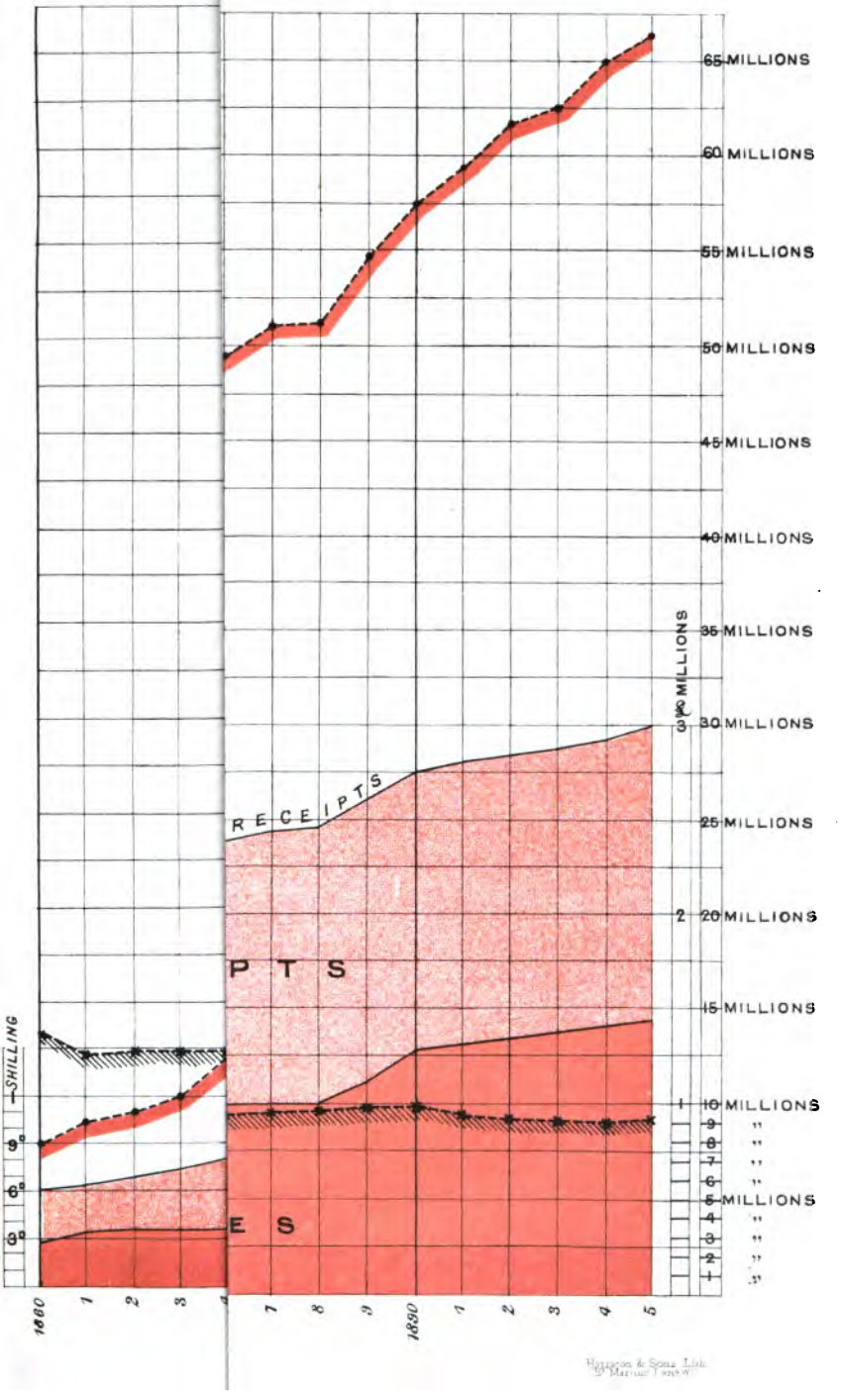

TABLE 4.—*Third Class Passenger Traffic.*

MIDLAND RAILWAY.

Year.	Number of Passengers.			Gross Receipts.		
	Number.	Increase.	Rate of Increase per Cent.	Gross Receipts.	Increase.	Rate of Increase per Cent.
				£	£	
1860	6,280,223*	—	—	276,572	—	—
'65	7,812,809*	1,532,586	24·40	362,399	85,827	31·04
'70	12,704,687*	4,891,878	62·61	556,914	194,515	53·68
'75	24,936,099*	12,231,412	96·27	1,130,458	573,544	102·99
'80	26,164,529*	1,228,430	4·93	1,336,773	206,315	18·25
'85	29,190,004†	3,025,475	11·57	1,528,555	191,782	14·35
'90	37,120,791*	7,930,787	27·17	1,753,486	224,931	14·71
'95	39,772,360†	2,651,569	7·14	1,917,993	264,507	9·38
Total increase	—	33,492,137	533·39	—	1,741,421	593·49
Average annual rate....	—	—	5·41	—	—	5·69

* Board of Trade returns. † Reports.

Third Class Working Expenses and Net Earnings.

The results of the analysis of the working expenses of the London and North Western and Midland Companies, particulars of which are given in the Appendix, show that although the passenger traffic expenses attributable to the London and North Western third class traffic, apportioned in the ratio of the respective number of vehicles, amounts to 63½ per cent. (63·49 per cent.[3]) of the entire expenses chargeable to this portion of the passenger service, the net revenue obtained from the third class amounted in 1894 to 1,596,865*l.*, equivalent to 55½ per cent.[4] of the third class receipts, and that out of gross receipts which amounted to little more than 10⅔*d.* per passenger, a net profit of nearly 6*d.* (5·89*d.*) was derived from the 65 million and odd third class passengers who travelled by that railway in that year.

The net earnings per passenger in the case of the Midland Company's third class traffic, with the working expenses apportioned in the same way, amounted, as will be seen from the following table, to almost precisely the same figure, 5·69*d.* per passenger.[5]

[3] Table C, Appendix.

[4] 55·42 per cent., see Table 5.

[5] Table 6.

TABLE 5.—LONDON AND NORTH WESTERN RAILWAY.

Passenger Traffic, 1894.

Class.	Number of Passengers.	Gross Receipts.	Working Expenses.	Net Receipts.	Per Passenger.			Per Passenger Train Mile.			Per Cent of Gross Receipts.
					Gross Receipts.	Expenses.	Net Receipts.	Gross Receipts.	Expenses.	Net Receipts.	
	Number.	£	£	£	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	Per cnt.
First class	1,891,921	480,323	420,790	59,533	60·93	53·33	7·55	5·37	4·70	0·67	12·39
Second „	2,928,939	240,300	317,818	Loss. − 77,518	19·69	26·04	−6·35	2·69	3·55	−0·86	Loss. 32·26
Third „	65,086,618	2,881,288	1,284,423	1,596,865	10·63	4·74	5·89	32·21	14·36	17·85	55·42
	69,907,478	3,601,911	2,023,031	1,578,880	12·37	6·35	6·42	40·27	22·62	17·65	43·83
Seasons	73,256	240,093	120,047	120,047	0·51	0·40	0·41	2·68	1·34	1·34	50·00
	69,980,734	3,842,004	2,143,078	1,698,927	13·18	7·35	5·83	42·95	23·96	18·99	44·22
Parcels luggage vans	....	799,044	399,522	399,522	....	....	....	8·93	4·47	4·48	50·00
Mails	....	189,179	94,590	94,589	....	....	....	2·12	1·06	1·06	50·00
Totals	....	4,830,227	2,637,190	2,193,038	....	....	....	54·00	29·49	24·53	45·40
Percentages	....	(100·00)	(55·60)	(45·40)	....	....	....	....	....	....	....

TABLE 6.—MIDLAND RAILWAY COMPANY.

Passenger Traffic, 1894.

Class.	Number of Passengers.	Gross Receipts.	Working Expenses.	Net Receipts.	Per Passenger.			Per Train Mile.			Per Cent. of Gross Receipts.
					Gross Receipts.	Expenses.	Net Receipts.	Gross Receipts.	Expenses.	Net Receipts.	
	Number.	£	£	£ Loss.	*d.*	*d.*	*d.* Loss.	*d.*	*d.*	*d.* Loss.	Per cnt. Loss.
First class	1,134,332	200,187	311,278	− 111,091	42·36	65·86	−23·50	2·96	4·61	−1·65	55·49
Second „	Nil	Nil	Nil	Nil	....	....	....	....	....	....	....
Third „	38,943,319	1,875,971	952,027	+ 932,944	11·56	5·87	5·69	27·75	14·08	13·67	49·25
	40,077,651	2,076,158	1,263,305	812,853	12·43	7·57	4·86	30·71	18·69	12·02	39·15
Seasons	− 106,757	174,717	87,358	87,359	....	....	....	2·58	1·29	1·29	50·00
	....	2,250,875	1,350,663	900,212	....	....	....	33·29	19·98	13·31	39·99
Parcels, &c.	....	535,020	267,510	267,510	....	....	....	7·91	3·96	3·95	50·00
Mails	....	56,938	28,469	28,469	....	....	....	0·84	0·42	0·42	50·00
Totals	....	2,842,833	1,646,642	1,196,191	....	....	....	42·04	24·36	17·68	42·08
Percentages	....	(100·00)	(57·92)	(42·08)	....	....	....	....	....	....	....

Merchandise Traffic. Receipts and Expenses.

LONDON AND NORTH WESTERN RAILWAY.

It would be impossible within the limits of a single paper to deal, except in a very general way, with the wide subject of the new rates and charges for merchandise traffic, and, as stated at the outset of the paper, these remarks have reference mainly to the relation they have, in the case of the London and North Western, to the actual cost of conveyance, and to the station and service terminal expenses of that railway company, as obtained from the analysis of its working expenses already referred to.

The entire "Merchandise Traffic" of the London and North Western Railway constitutes, as in the case of the other principal railways in this country, considerably more than half the gross revenue, and is classified in the Rates and Charges Act under the usual distinctive headings, the lower classes of merchandise being designated by the three first letters of the alphabet, and the higher classes by the first five numerals.

The broad classification, however, of merchandise under the respective heads of "Goods" and "Mineral Traffic," as given in the Railway Company's annual reports and in the Board of Trade Returns, will suffice for the purpose of these investigations.

The gross goods traffic receipts in the case of the London and North Western for 1894 were 4,160,131*l.*, or just 36½ per cent. of the entire revenue of that railway;[6] being respectively 2,075*l.* per mile of railway, 8*s.* 9*d.* per full train mile, and 0·8759*d.* per ton per mile, with an average net load of 120 tons.[7] These receipts, it should be noticed, include the station and service terminal charges at both ends. (Table A, Part I, Appendix.)

Goods Traffic. Working Expenses.

The working expenses (2,153,631*l.*) amounted to nearly 52 per cent. of the merchandise traffic receipts, or to 4*s.* 3⅜*d.* (51·69*d.*) per train mile, and with the usual allowance of 10 per cent. for empty train mileage, would be increased to 4*s.* 6½*d.*, which, with the net load referred to, would be nearly ½*d.* (0·45*d.*) per ton per mile, leaving a profit of 4*s.* 2⅝*d.* per full train mile, and a little less than a ½*d.* (0·42*d.*) per ton per mile. (Table A, Part II, Appendix.)

Mineral Traffic. Receipts.

LONDON AND NORTH WESTERN RAILWAY.

From a reference to Table E in the Appendix, it will be seen that nearly three-fourths of the tonnage conveyed over the railways in the kingdom consists of minerals, which come under the category of the "A" or lowest class of merchandise traffic,

[6] Table A, Part I, Appendix.

[7] See Sir George Findlay's paper, "Institute of Civil Engineers," vol. xli, p. 5.

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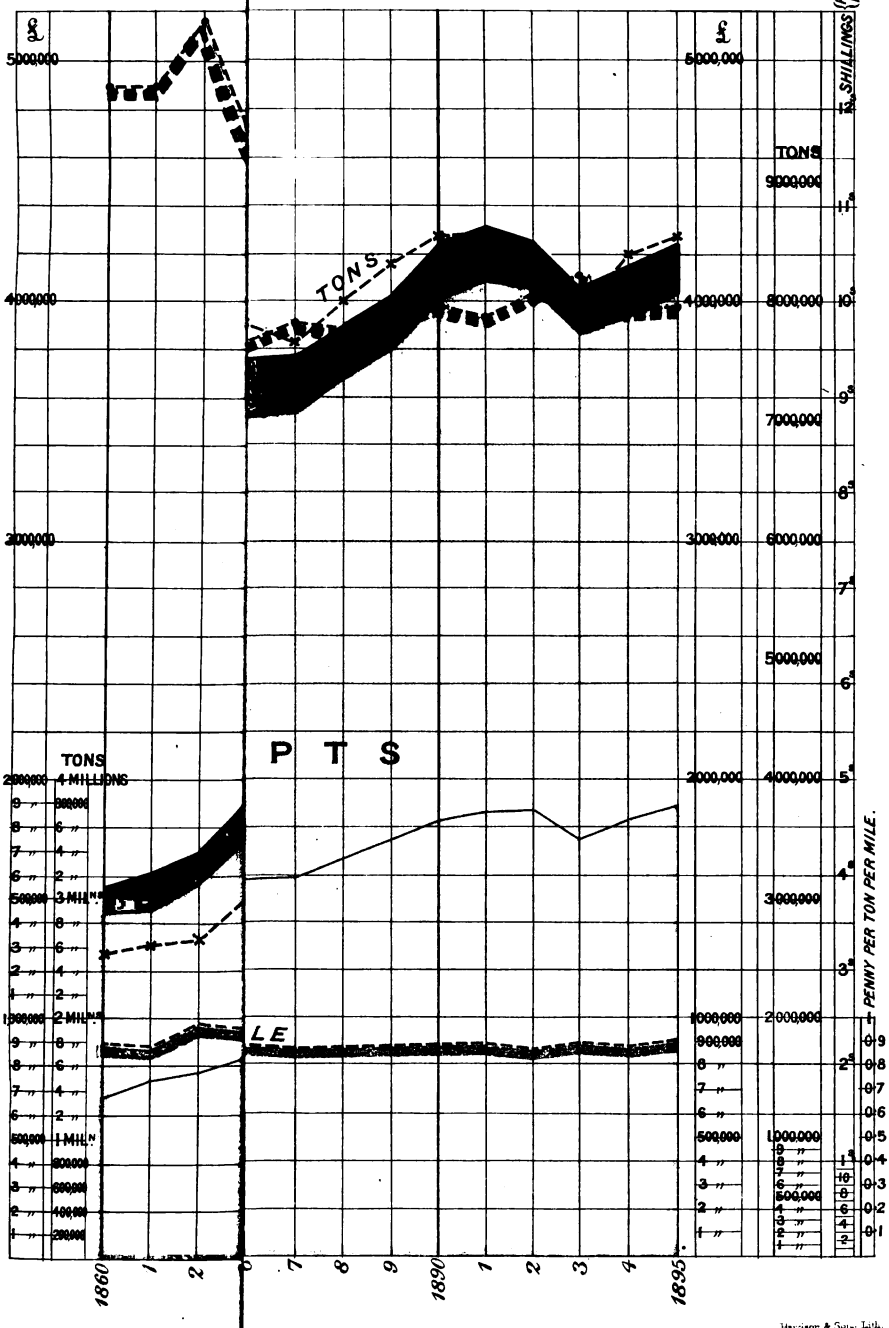

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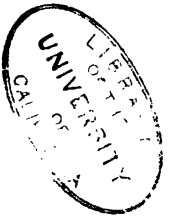
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the gross receipts from this source constituting nearly half the revenue derived from all other classes of merchandise.

The mineral traffic of the London and North Western Railway, with which it is intended more particularly to deal in this paper, is, with the exception of that of the North Eastern, the largest of any railway company in the kingdom; the tonnage in 1894 slightly exceeding 28,839,000 tons, whilst the revenue derived therefrom amounted to 2,411,917*l.* (Table A, Part I, Appendix), equivalent to 1,276*l.* per mile of railway, 1*s.* 8*d.* per ton, and with an average net load of 250 tons, to 0·4210*d.* per ton per mile; these gross receipts per ton per mile including the charge for the conveyance of the full trains, together with the haulage of the returned empty wagons, and also for the station terminals at each end, to the cost of which and the expenses of conveyance attention will presently be directed.

Working Expenses.

The working expenses of the mineral traffic of this railway in 1894 amounted to 1,476,731*l.*, or to 3*s.* per train mile, which with the return empty mileage (estimated at 90 per cent. of the full train mileage) would be equivalent to 5*s.* 4½*d.* per full train mile; this with an average net load of 250 tons[8] would amount to a little over a farthing (0·2578*d.*) per ton per mile; and inasmuch as the gross receipts per ton per mile with the same net load amount to considerably less than a halfpenny (0·4210*d.*) per ton per mile (Table A, Part I, Appendix), it leaves a profit of only 0·16*d.* per ton per mile on the 28,839,389 tons of minerals conveyed by this company in 1894.[9]

Rates and Charges, &c., Acts, 1891 *and* 1892.

The rates and charges which, under the provisions of these Acts of 1891 and 1892, railway companies are now authorised to make in respect to the merchandise traffic, are separately dealt with under the comprehensive titles of "Conveyance" and of "Station" and "Service Terminals," terms which correctly indicate the nature and extent of the enormous business the railway companies have acquired as common carriers, originally never contemplated by the legislature, as the toll collecting clauses in the earliest railway Act testify.

With the view of ascertaining what relation the new rates and charges for merchandise and other traffic bear to the expenses incurred by the railway companies in connection with the services rendered for conveyance and terminal services, the writer of the paper has made a careful analysis, under these two heads, of the working expenses of the London and North Western Railway of which the following is a brief summary:—

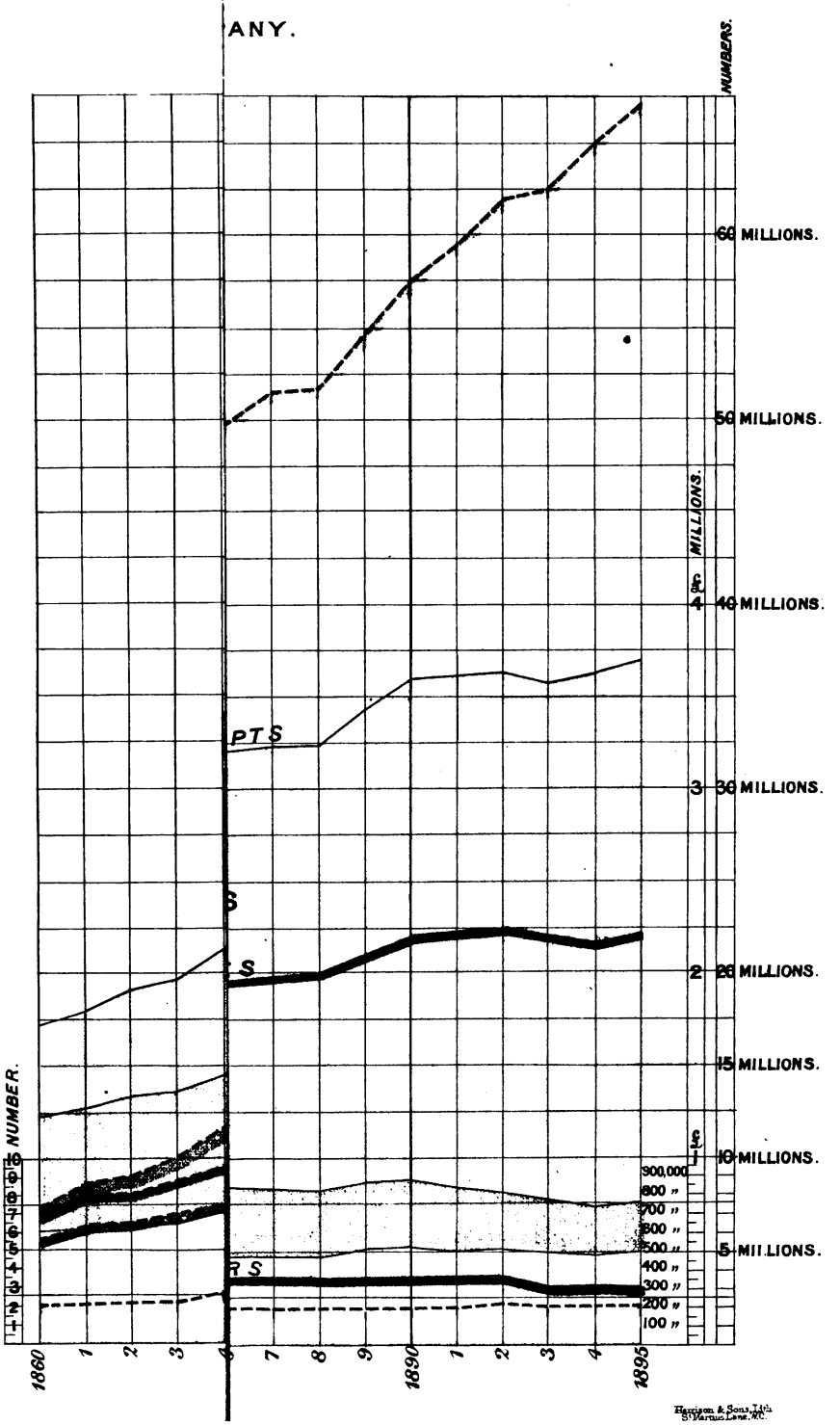
[8] See Sir George Findlay's paper, "Institute of Civil Engineers," vol. xli, p. 5.
[9] Table A, Part I, Appendix.

LONDON AND NORTH WESTERN RAILWAY, 1894.

TABLE 7.—(*Summary of Table D, Appendix*). *Station and Service Terminal Expenses and Cost of Conveyance.*

	Passenger Traffic.					Goods Traffic.				Mineral Traffic.			
	Total Expenses.	Total Passenger Expenses.	Terminals.	Conveyance.	Per Train Mile.	Total Goods Expenses.	Terminals.	Conveyance.	Per Ton.	Total Mineral Expenses.	Station Terminals.	Conveyance.	Per Ton.
	£	£	£	£	*d.*	£	£	£	*d.*	£	£	£	*d.*
Permanent way and works	1,088,039	515,087	—	—	—	276,653	—	—	—	296,300	—	—	—
Stations	—	—	113,945	—	1·27	—	94,786	—	2·71	—	57,684	—	0·48
Permanent way	—	—	—	401,141	4·48	—	—	181,867	5·20	—	—	238,616	1·99
Locomotive expenses	1,527,721	630,963	—	630,963	7·06	368,785	—	368,785	10·55	527,972	—	527,972	4·38
Carriage repairs	319,236	319,236	—	319,236	3·55	—	—	—	—	—	—	—	—
Wagon „	124,656	—	—	—	—	—	—	—	—	—	—	—	—
Goods	—	—	—	—	—	83,104	—	83,104	2·38	—	—	—	—
Minerals	—	—	—	—	—	—	—	—	—	41,552	—	41,552	0·35
Traffic expenses	2,391,861	810,446	—	—	—	1,111,150	—	—	—	470,264	—	—	—
Station	—	—	797,147	—	8·90	—	1,073,901	—	30·71	—	462,273	—	3·85
Conveyance	—	—	—	13,299	0·15	—	—	37,249	1·07	—	—	7,991	0·07
General charges, law and parliamentary expenses	664,685	281,560	—	—	—	242,478	—	—	—	140,647	—	—	—
			112,737	—	1·26		154,046	—	4·41		54,740	—	0·46
Rates and taxes			—	168,823	1·89		—	88,432	2·53		—	85,907	0·71
Compensation, passenger	−44,942	44,942	—	44,942	0·52	—	—	—	—	—	—	—	—
Compensation, goods	−49,302	—	—	—	—	49,302	—	49,302	1·41	—	—	—	—
Government duty	−33,280	33,280	—	33,280	0·37	—	—	—	—	—	—	—	—
Mileage and demurrage	23,830	1,675	—	1,675	0·02	22,155	—	22,155	0·63	—	—	—	—
Totals	6,267,552	2,637,189	1,023,829	1,613,359	29·47	2,153,627	1,322,733	830,894	61·60	1,476,735	574,697	902,038	12·29
Cost per train mile and per ton	—	*2s.* 5½*d.*	11½*d.*	*1s.* 6*d.*	—	Per ton. 5*s.* 1½*d.*	Per ton. 3*s.* 1¾*d.*	Per ton. 1*s.* 11¾*d.*	—	Per ton. 1*s.* 0½*d.*	Per ton. 4¾*d.*	Per ton. 7½*d.*	—
Percentage	—	(100·00)	(38·82)	(61·18)	—	(100·00)	(61·42)	(38·58)	—	(100·00)	(38·92)	(61·08)	—

ANY.



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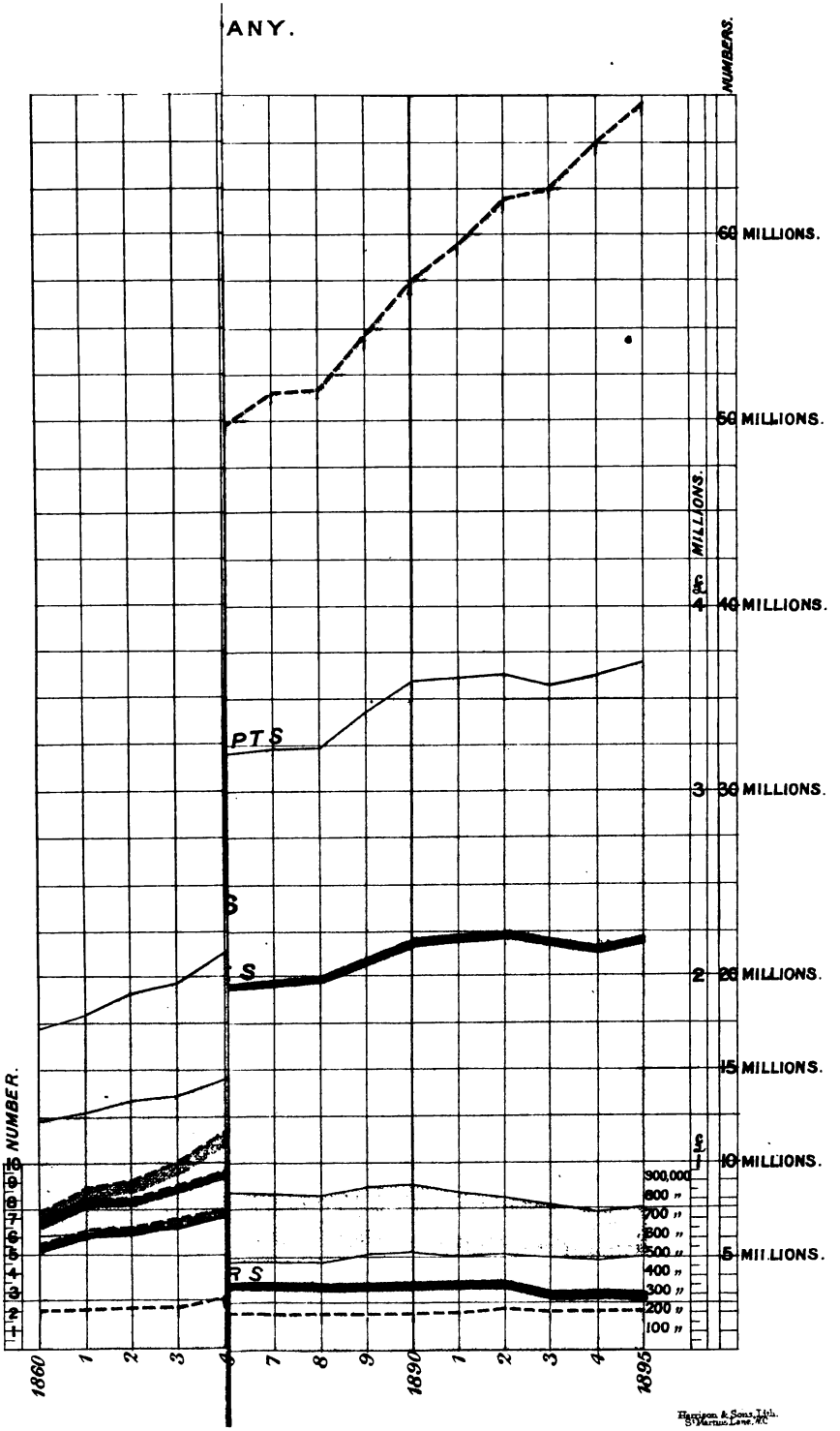
LONDON AND NORTH WESTERN RAILWAY, 1894.

TABLE 7.—(*Summary of Table D, Appendix*). *Station and Service Terminal Expenses and Cost of Conveyance.*

	Passenger Traffic.					Goods Traffic.				Mineral Traffic.			
	Total Expenses.	Total Passenger Expenses.	Terminals.	Conveyance.	Per Train Mile.	Total Goods Expenses.	Terminals.	Conveyance.	Per Ton.	Total Mineral Expenses.	Station Terminals.	Conveyance.	Per Ton.
	£	£	£	£	*d.*	£	£	£	*d.*	£	£	£	*d.*
Permanent way and works	1,088,039	515,087	—	—	—	276,653	—	—	—	296,300	—	—	—
Stations	—	—	113,945	—	1·27	—	94,786	—	2·71	—	57,684	—	0·48
Permanent way	—	—	—	401,141	4·48	—	—	181,867	5·20	—	—	238,616	1·99
Locomotive expenses	1,527,721	630,963	—	630,963	7·06	368,785	—	368,785	10·55	527,972	—	527,972	4·38
Carriage repairs	319,236	319,236	—	319,236	3·55	—	—	—	—	—	—	—	—
Wagon „	124,656	—	—	—	—	—	—	—	—	—	—	—	—
Goods	—	—	—	—	—	83,104	—	83,104	2·38	—	—	—	—
Minerals	—	—	—	—	—	—	—	—	—	41,552	—	41,552	0·35
Traffic expenses	2,391,861	810,446	—	—	—	1,111,150	—	—	—	470,264	—	—	—
Station	—	—	797,147	—	8·90	—	1,073,901	—	30·71	—	462,273	—	3·85
Conveyance	—	—	—	13,299	0·15	—	—	37,249	1·07	—	—	7,991	0·07
General charges, law and parliamentary expenses	664,685	281,560	—	—	—	242,478	—	—	—	140,647	—	—	—
Rates and taxes			112,737	—	1·26		154,046	—	4·41		54,740	—	0·46
			—	168,823	1·89		—	88,432	2·53		—	85,907	0·71
Compensation, passenger	−44,942	44,942	—	44,942	0·52	—	—	—	—	—	—	—	—
Compensation, goods	−49,302	—	—	—	—	49,302	—	49,302	1·41	—	—	—	—
Government duty	−33,280	33,280	—	33,280	0·37	—	—	—	—	—	—	—	—
Mileage and demurrage	23,830	1,675	—	1,675	0·02	22,155	—	22,155	0·63	—	—	—	—
Totals	6,267,552	2,637,189	1,023,829	1,613,359	29·47	2,153,627	1,322,733	830,894	61·60	1,476,735	574,697	902,038	12·29
Cost per train mile and per ton	—	*2s.* 5½*d.*	11½*d.*	*1s. 6d.*	—	Per ton. *5s.* 1½*d.*	Per ton. *3s.* 1¾*d.*	Per ton. *1s.* 11¾*d.*	—	Per ton. *1s.* 0½*d.*	Per ton. 4¾*d.*	Per ton. 7½*d.*	—
Percentage	—	(100·00)	(38·82)	(61·18)	—	(100·00)	(61·42)	(38·58)	—	(100·00)	(38·92)	(61·08)	—

ANY.



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CLASS A.—*Average Mileage Rate.*

Miles.	Miles.		d.	d.
20	20	×	0·95	= 19·0
50	50	×	0·85	= 42·5
100	100	×	0·50	= 50·0
170				111·5
	$\frac{111·5}{170}$ = 0·656*d.* per ton per mile			

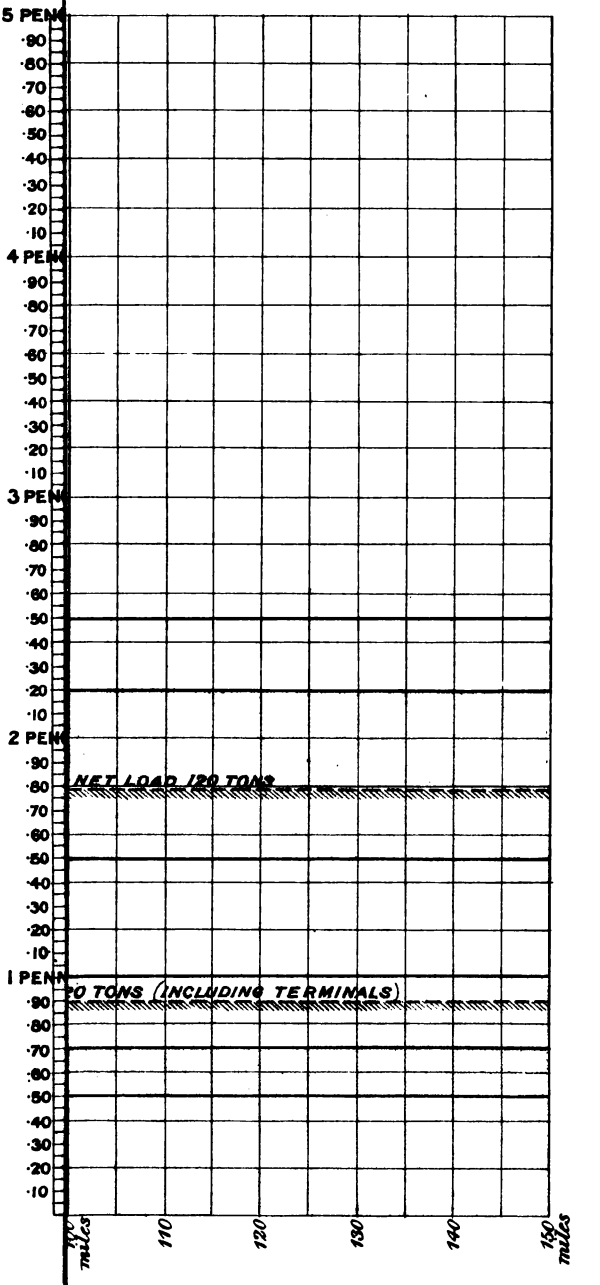
the average actual expenses, as already explained, being, roundly, about one farthing (0·26*d.*), and the gross receipts 0·42 of a penny per ton per mile.

In addition to the maximum charge for conveyance, a maximum station terminal of 3*d.* per ton at "each end" is allowed to this and (with two unimportant exceptions) to all the railway companies in the United Kingdom, the cost to the London and North Western Company, however, of its terminal expenses, as already stated, amounted in 1894 to over 39 per cent. of its mineral traffic expenses, and to $4\frac{3}{4}$*d.* per ton, or to $2\frac{1}{3}$*d.* at each end. (Table 7.)

Merchandise Traffic Conveyance Rates.

The average maximum conveyance rate allowed the London and North Western Company in respect of the seven higher classes of "merchandise" for distances not exceeding 150 miles, which is about the average "lead" of the merchandise traffic of this railway is, as it will be seen from the accompanying table, $1\frac{3}{4}$*d.* (1·79*d.*) per ton per mile as compared with the Company's average goods receipts of 0·88*d.* per ton per mile, the average net earnings only being, as already stated, a little under a halfpenny (0·44*d.*) per ton per mile. (Table A, Part I, Appendix.)

OMPANY.
RTH WESTERN Rʸ ACT 1891.

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Rates in respect of Merchandise comprised in Classes B, C, 1, 2, 3, 4, *and* 5. *London and North Western Railway (Rates and Charges) Order Confirmation Act*, 1891.

Class of Traffic.	Maximum Rates for Conveyance. For the first 20 Miles or any part of such Distance.	For the next 30 Miles or any part of such Distance.	For the next 50 Miles or any part of such Distance.	For the remainder of the Distance, say	Mean Rate.
	20 Miles.	50 Miles.	100 Miles.	150 Miles.	
	Per ton per mile.				
	d.	*d.*	*d.*	*d.*	*d.*
B	1·25	1·00	0·80	0·50	0·7188
C	1·80	1·50	1·20	0·70	1·0500
No. 1.....	2·20	1·85	1·40	1·00	1·3328
„ 2.....	2·65	2·30	1·80	1·50	1·7906
„ 3.....	3·10	2·65	2·00	1·80	2·0766
„ 4.....	3·60	3·15	2·50	2·20	2·5297
„ 5.....	4·30	3·70	3·25	2·50	3·0304
	7)18·90	7)16·15	7)12·95	7)10·20	7)12·5289
Mean	2·70	2·307	1·85	1·457	1·7898
	Miles.	Miles. *d.*	*d.*		
	20	20 × 2·70	= 54·00		
	50	50 × 2·307	= 115·35		
	100	100 × 1·85	= 185·00		
	150	150 × 1·457	= 218·55		
	320		572·90		
			d.		
		572·9 / 320	= 1·79		

Maximum Station and Service Terminals.

The average maximum station terminals,[10] common to all railway companies, with the two exceptions already alluded to, are as follows:—

	Per Ton. *s.*	*d.*
Average station terminals, one end	1	3·43
„ „ other end	1	3·43
„ charge for loading	–	10·67
„ „ unloading	–	10·67
„ „ covering	–	2·25
„ „ uncovering	–	2·25
	4	8·70

The actual cost of these terminal charges to the London and North Western Company in 1894 being as much as 3*s.* 2*d.* per ton, as already stated. (Table 7.)

[10] Table F, Appendix.

Cost of Station Terminals.

Some idea is afforded of the large amount of capital expended by this Company in the construction and equipment of their terminal and other stations, with many miles of sidings, covering acres of valuable land in the immediate vicinity of our large towns, by simply drawing attention to the fact that considerably more than a quarter of a million sterling is annually spent in their maintenance alone, as will be seen from the following abstract.

Cost of terminal Services.

A glance at the items included under the heads of "Traffic "Expenses," "General Charges," &c., is sufficient to show that in addition to the "handling" services rendered at stations in "load-"ing," "unloading," "covering," and "uncovering," for which some provision has been made in the Acts of 1891 and 1892, the great bulk of them are for the most part directly chargeable as service "terminals," such for instance as are included in the chief item of "Salaries and Wages" (1,700,187*l.*),[11] which almost exclusively represents the amounts paid to those employed at terminal and other stations; while by far the largest portion of the cost of the other items, such as general charges, is attributable to the indirect services rendered by the staff, from the general manager down to the office boy, which are equally chargeable to this branch of the service. The question is how has the cost of these services, exceeding two and a-half millions sterling per annum (2,654,844*l.*), been provided for in the rates and charges Acts of 1891 and 1892, as it is quite evident they should be, either under the head of "Conveyance" or "Terminal Charges?" It is clear they cannot properly be attributed to the former, inasmuch as the expenses of "conveyance" mainly relate to the maintenance of the way and works, and to the locomotive, carriage, and wagon expenses, full particulars of which are separately given in the railway company's accounts.

[11] Table A, Part V, Appendix.

Passenger Traffic.

	Station Terminals.	Per Train Mile.	Service Terminals.	Per Train Mile.	Total Cost of Terminals.	Per Train Mile.
	£	*d.* Train mile.	£	*d.* Train mile.	£	*d.* Train mile.
Repairs of stations, signals, sidings, &c.	113,945	1·27	—	—	113,945	1·27
Traffic expenses	—	—	797,147	8·90	797,147	8·90
General charges, rates and taxes, law, &c.	—	—	112,737	1·26	112,737	1·26
Total	113,945	1·27	909,884	10·16	1,023,829	11·43
	Goods Traffic.					
		Per ton.		Per ton.		Per ton.
Repairs of stations, &c.	94,786	2·71	—	—	94,786	2·71
Traffic expenses	—	—	1,073,901	30·71	1,073,901	30·71
General charges, &c.	—	—	154,046	4·56	154,046	4·41
Total	94,786	2·71	1,227,947	35·12	1,322,733	37·83
	Mineral Traffic.					
		Per ton.		Per ton.		Per ton.
Repairs of stations, &c.	57,684	0·48	—	—	57,684	0·48
Traffic expenses	—	—	462,273	3·85	462,273	3·85
General charges, &c.	—	—	54,740	0·46	54,740	0·43
Total	57,684	0·48	517,013	4·31	574,697	4·79
Totals	266,415	—	2,654,844	—	2,921,259	—
Percentage	(9·12)	—	(90·88)	—	(100·00)	—

The comparison made between the authorised maximum rates and charges for conveyance and the actual expenses incurred by that Company in connection with this important branch of its railway business, would in the first place certainly appear, from the comparatively small average receipts per ton per mile this Company derives from the higher classes of merchandise traffic, to indicate that the greater portion consists of the lower classes of merchandise, and in the next place that, having regard to the very large proportion the terminal expenses constitute in the working of a railway, no adequate allowance has been made in the terminal rates and charges authorised by the Railway Acts of 1891 and 1892, either in respect of goods or mineral traffic.

Another and most important conclusion to be drawn from these investigations is the proof afforded that the railway companies have nothing to fear but everything to gain by furnishing fuller information in their annual reports, such, for instance, as was for many years given in the London and North Western reports already alluded to, which, it is needless to say, would materially

assist in ascertaining the actual cost of "conveyance" and of the "station and service terminals" expenses, and also make clear to the public what evidently they at present have no adequate idea of, viz., the large proportion they bear to the very moderate rates and charges which as a rule are made by the principal railway companies in this country.

The expense and the difficulty involved in dealing with "mixed "trains," which appear to be the main obstacles to this information being afforded, constitute but a small factor in the case, inasmuch as any reasonable, even if arbitrary, apportionment of these minor expenses would in no appreciable way affect the reliability of the results; and as regards additional cost and labour, these would be more than compensated for by affording the railway companies the means of satisfying the freighters and the public generally that the railway rates actually charged are not, as generally imagined, arbitrarily determined without reference to the cost involved, but based on sound reliable data.

Whatever objections may be taken to the method employed by the writer of the paper in the apportionment of the working expenses to the different classes of the London and North Western Railway Company's traffic, it should be borne in mind that the same method has been adopted throughout, the results obtained affording reliable means at least of ascertaining the great changes which have occurred in the traffic of that railway during the long period of thirty-five years; he, however, is of opinion that the method affords the means of determining, within narrow limits of error, the expenses properly attributable to each of the three great branches of railway traffic business, viz., the passenger, goods, and mineral traffic, and also of determining the cost of conveyance and of the terminal expenses incident to each.

It only remains to draw attention to the very significant fact that these large terminal expenses represent but an average, by far the greater portion of the expenses being attributable to the terminal and principal stations; in view of this and of the present very moderate average rate charged for conveyance by the railway companies, as illustrated in the typical case of the London and North Western Railway, there would appear to be feasible possibilities of tariff readjustments being made by the railway companies themselves, well outside the actual expenses incurred, such as would offer sufficient inducements for the investment of capital in developing the latent traffic resources of many rich districts in this country at present far too remote, if measured by distance, from great commercial centres to afford any prospect of a profitable market being obtained for either agricultural or any other kind of produce.

APPENDIX. TABLE A—PART I. LONDON AND NORTH WESTERN RAILWAY, 1894.

Traffic Receipts, Working Expenses, and Net Receipts. Ratios used in Apportionment of Expenses.

	Traffic Receipts.	Train Miles.	Per Cent.	Receipts.	Per Cent.		Tonnage.	Per Cent.
	£			£				
Passenger	—	21,467,625	51·77	4,830,228	42·36	Merchandize	8,392,077	22·54
Goods and Live stock	3,924,579 / 235,552	19,999,222	48·23	4,160,131	36·48	Minerals	28,839,389	77·46
Minerals	—	—	—	2,411,917	21·16			
Totals	4,160,131	41,466,847	100·00	11,402,276	100·00		37,231,466	100·00

	Passenger Traffic.	Per Cent.	Per Train Mile.	Goods Traffic.	Per Cent.	Per Train Mile.	Ex Empty. Per Full Train Mile.	Ex Empty. Per Ton per Mile.	Mineral Traffic.	Per Cent.	Per Train Mile.	Ex Empties. Per Full Train Mile.	Ex Empties. Per Ton per Mile.
	£		d.	£			d.	120 tons.	£			d.	250 tons.
Total gross receipts (ex canals, rents, &c.)	4,830,228	100·00	54·00	4,160,131	100·00	99·85	105·10	0·8759	2,411,917	100·00	57·89	105·25	0·4210
Working expenses	2,637,190	54·60	29·48	2,153,627	51·77	51·69	54·41	0·4534	1,476,731	61·23	35·44	64·44	0·2578
Net receipts	2,193,038	55·40	24·52	2,006,504	48·23	48·16	50·69	0·4225	935,186	38·77	22·45	40·82	0·1632

TABLE A—PART II. LONDON AND

Apportionment of the

					Per Cent. of Working Expenses.	Working Expenses.	Ratio of Apportionment.	Passenger Traffic.		
								—	Per Cent. of Working Expenses.	Per Train Mile.
					Per cnt.	£		£	Per cnt.	d.
Maintenance of way (stores see below)					17·36	1,088,039	Table A, Pt. III	515,087	19·53	5·76
Locomotive power					24·37	1,527,721	„ D	630,963	23·93	7·06
Carriage repairs				443,892*l.*	5·09	319,236	Passenger	319,236	32·11	3·55
Wagon „					1·99	124,656	G. ½, M. ½	—	—	—
Traffic expenses—										
	Ratio Receipts.									
Coaching	—	42·36	—	37·92	38·16	2,391,861	Table A, Part V, and ratio 1861 to 1885	810,447	30·73	9·06
Merchandize	63·3	36·48	57·64	62·08				—	—	—
Minerals	36·7	21·16		—				—	—	—
	100·0	100·00	—	100·00						
General charges					4·79	300,341	Receipts	127,234	4·82	1·42
Law charges				34,893*l.*	0·45	27,893	„	11,816	0·45	0·13
Parliamentary					0·11	7,000	„	2,965	0·11	0·04
Compensation — Passengers					0·72	44,942	Passenger	44,942	1·70	0·50
Compensation — Goods, &c.					0·79	49,302	Goods	—	—	—
Rates and taxes					5·26	329,451	Receipts	139,555	5·29	1·56
Government duty					0·53	33,280	Passenger	33,280	1·26	0·37
Mileage and demurrage					0·38	23,830	Ratio {1861/71}	1,675	0·06	0·02
Total expenses					100·00	6,267,552		2,637,190	100·00	29·47
Percentage of expenses					—	Per cnt. 100·00		Per cnt. 42·08	—	—

	Goods Traffic per Ton.		Average Lead.
	Per Ton.	Per Ton per Mile.	
Gross receipts	118·97	0·8759	118·97 / 0·8759 ..... = 136
Working expenses	61·60	0·4534	Empty 10 per cent. ..... = 14
Net receipts	57·37	0·4225	150 miles

NORTH WESTERN RAILWAY, 1894.

Working Expenses.

GOODS TRAFFIC.					MINERAL TRAFFIC.				
—	Per Cent. of Working Expenses.	Per Train Mile.	Ex Empties. 95 per Cent. Full Trains.		—	Per Cent. of Working Expenses.	Per Train Mile.	Ex Empties. 55 per Cent. Full Train Miles.	
			Per Full Train Mile.	Per Ton per Mile.				Per Full Train Mile.	Per Ton per Mile.
£	Per cnt.	d.	d.	120 tons.	£	Per cnt.	d.	d.	250 tons.
276,656	12·85	6·64	6·99	0·0583	296,297	20·07	7·11	12·93	0·0517
368,785	17·12	8·85	9·32	0·0777	527,972	35·75	12·67	23·04	0·0922
—	—	—	—	—	—	—	—	—	—
83,104	3·86	1·99	2·10	0·0175	41,552	2·81	1·00	1·81	0·0071
—	—	—	—	—	—	—	—	—	—
1,111,151	51·59	26·67	28·07	0·2339	—	—	—	—	—
—	—	—	—	—	470,263	31·85	11·29	20·52	0·0821
109,565	5·09	2·63	2·77	0·0231	63,552	4·30	1·53	2·77	0·0111
10,175	0·47	0·25	0·26	0·0021	5,902	0·40	0·14	0·26	0·0010
2,554	0·12	0·06	0·06	0·0005	1,481	0·10	0·04	0·07	0·0003
—	—	—	—	—	—	—	—	—	—
49,302	2·29	1·18	1·24	0·0103	—	—	—	—	—
120,184	5·58	2·89	3·04	0·0253	69,712	4·72	1·67	3·04	0·0122
—	—	—	—	—	—	—	—	—	—
22,155	1·03	0·53	0·56	0·0047	—	—	—	—	—
2,153,627	100·00	51·69	54·41	0·4534	1,476,731	100·00	35·44	64·44	0·2578
Per cnt. 34·36	—	—	—	—	Per cnt. 23·56	—	—	—	—

	Mineral Traffic per Ton.		Average Lead.
	Per Ton.	Per Ton per Mile.	
Gross receipts	20·07	0 4210	$\frac{20·07}{0·4210}$ ..... Full. = 47·67
Working expenses	12·29	0·2578	Empty 90 per cent. 47·67 = 42·90
Net receipts	7·78	0·1632	90·57 miles

TABLE A—PART III. LONDON AND NORTH WESTERN RAILWAY, YEAR 1894.

Apportionment of Permanent Way, Works, &c., Expenses. Ratios used in Apportionment.

Receipts.	Percentage.		Train Mileage.	Percentage.	Gross Tonnage.	Percentage.
Passenger traffic....	42·36	42·36	Passenger traffic	51·77	Goods & live stock	32·32
Goods & live stock	36·48	57·64	Goods & live stock	48·23	Minerals	67·68
Minerals	21·16		Minerals			
	100·00	100·00		100·00		100·00

	Total Working Expenses.	Apportioned to				Apportioned to			
		Ratio.	Passenger Traffic.	Ratio.	Goods, and Mineral Traffic.	Ratio.	Goods Traffic.	Ratio.	Mineral Traffic.
	£	Per cnt.	£	Per cnt.	£	Per cnt.	£	Per cnt.	£
Salaries	59,334	42·36[a]	25,134	57·64[a]	34,200	63·30[b]	21,649	36·70[b]	12,551
Permanent Way*	528,541	51·77[c]	273,633	48·23[c]	254,908	32·32[d]	82,384	67·68[d]	172,524
Works of line, &c.	180,933	42·36[a]	76,647	57·64[a]	104,286	63·30[b]	66,013	36·70[b]	38,273
Stations	107,765	,,	45,651	,,	62,114	,,	39,318	,,	22,796
,, rebuilding	35,000	,,	14,827	,,	20,173	,,	12,770	,,	7,403
Signals, sidings, &c.	87,276	,,	36,972	,,	50,304	,,	31,842	,,	18,462
	998,849	47·34	472,864	52·66	525,985	25·43	253,976	27·23	272,009
Joint stations and lines.....	89,190	mean ratio	42,223	,,	46,967	,,	22,679	,,	24,288
	1,088,039	47·34	515,087	52·66	572,952	25·43	276,655	27·23	296,297
Percentage of expenses to total permanent way expenses	Per cnt. (100·00)	—	Per cnt. (47·)34	—	Per cnt. (52·66)	—	Per cnt. (25·43)	—	Per cnt. (27·23)

[a] Ratio of receipts. [b] Ratio of goods and merchandise Receipts. [c] Ratio of train miles.
[d] Apportioned in ratio of gross tonnage as follows:—

	£	Per Cent.
* Permanent way and works	709,474	75·51
Stations, sidings, signals.....	230,041	24·49
	939,515	100·00

	Tons.	Ratio. Per cnt.
Goods and Live Stock—		
Net load	8,392,077	
Tare weight of wagons	16,784,154	
,, returned empty, 10 per cent.	1,678,415	
	26,854,646	32·32
Mineral Traffic—		
Net load	28,839,389	
Tare weight of wagons	14,419,695	
,, returned empty, 20 per cent.	12,977,726	
Total gross load.....	56,236,810	67·68
	83,091,456	100·00

TABLE A—PART IV. LONDON AND NORTH WESTERN RAILWAY. YEAR 1894.

Apportionment of Locomotive Expenses between Passengers, Goods and Minerals.

	Train Miles.	Ratio.	Ratio of Gross Tonnage.
Passengers	21,467,625	Per cnt. 51·77	Per cnt. —
Goods	19,999,222	48·23	32·32
Minerals			67·68
Total	41,466,847	100·00	100·00

	Total Working Expenses.	Apportioned to				Apportioned to			
		Ratio.	Passenger Traffic.	Ratio.	Goods and Mineral Traffic.	Ratio.	Goods Traffic.	Ratio.	Mineral Traffic.
	£	Rec.	£	Rec.	£	Rec.	£	Rec.	£
Salaries, office expenses, &c.	56,743	42·36	24,036	57·64	32,707	36·48	20,700	21·16	12,007
Running Expenses.									
Wages connected with the working of locomotive engines	585,165	38·02[a]	222,480	61·98[a]	362,685	½	181,343	½	
Coke and coal	395,393	34·34[b]	135,778	65·66[b]	259,615	32·32[c]	83,907	67·68[c]	181,343
Water	15,385	„	5,283	„	10,102	„	3,265	„	175,708
	64,062	T.M. 51·77	33,165	T.M. 48·23	30,897	„	9,986	„	6,837
Oil, tallow and other stores	1,060,005		396,706		663,299		278,501		20,911
									384,798
Repairs and Renewals.									
Wages	188,903	T.M. 51·77	97,796	T.M. 48·23	91,107	32·32[c]	29,446	67·68[c]	
Materials	209,485	„	108,450	„	101,035	„	32,654		61,661
	398,388		206,246		192,142		62,100		68,381
									130,042
Special expenses	19,667	Rec. 42·36	8,331	Rec. 57.64	11,336	Rec. 36·48	7,174	Rec. 21·16	4,162
Station and engines	7,319	do.	3,100	do.	4,219	do.	2,670	do.	1,549
Total	1,542,122	51·77	638,419	48·23	903,703	41·07	371,145	58·93	532,558
Deduct cost of mileage sundry trains	−14,402		−7,456		−6,946		−2,360	„	−4,586
Total	1,527,720	51·77	630,963	48·23	896,757	41·07	368,785	58·93	527,972
Percentage of expenses to total locomotive expenses	Per cnt. (100 00)		Per cnt. (41·30)		Per cnt. (58·70)		Per cnt. (24·14)		Per cnt. (34·56)

[a] Apportioned in ratio of train miles divided by speed of trains, viz:—

35 miles per hour for passenger trains ..... $\frac{21,467,628}{35}$ = 613,361 = 38·02

„ goods „ ..... } $\frac{19,999,222}{20}$ = 999,961 = 61·98
„ minerals „ ..... }

1,613,322 100·00

[b] Apportioned in ratio of train miles multiplied by consumption of fuel per mile, viz.:—

Passenger engines ..... 21,467,628 × 30·3 lbs. = 650,469,128 = 34·34
Goods „ ..... } 19,999,222 × 62·2 „ = 1,243,951,608 = 65·66
Minerals „ ..... }

1,894,420,736 100·00

[c] Apportioned in ratio of gross tonnage of goods and minerals (see Table A, Part III).

TABLE A—PART V. LONDON AND NORTH WESTERN RAILWAY.

Apportionment of Traffic Expenses

As between "coaching" and "merchandise," on the basis of the actual results given in the railway company's reports from 1860 to 1865 inclusive (but discontinued since), where the coaching and merchandise traffic expenses are shown separately.

Average of Twenty-five Years.	Per Cent.
Coaching expenses	37·92
Merchandise and minerals	62·08
	100·00

Traffic Expenses.

Items.	Traffic Expenses.	Ratio of Apportionment.	Passenger Traffic Expenses (Coaching).	Ratio of Apportionment.	Goods and Mineral Expenses combined.	Ratio of Apportionment.	Goods Expenses.	Ratio of Apportionment.	Mineral Expenses.
	£	Pr. ct.	£	Per cnt.	£	Pr. ct.	£	Pr. ct.	£
Salaries and wages	1,700,187	37·92	664,711	62·08	1,055,476	63·30	668,116	36·70	387,360
Fuel, lighting, &c.	212,896	,,	80,730	,,	132,166	,,	83,661	,,	48,505
Clothing	26,669	—	26,667	—	—	—	—	—	—
Printing, stationery, tickets, &c.	70,142	37·92	26,598	62·08	43,544	63·30	27,563	36·70	15,981
Horses, vans	212,626	—	—	Goods	212,626	—	212,626	—	—
Wagon covers	23,468	—	—	,,	23,468	—	23,468	—	—
Agents' commission	3,310	—	—	,,	3,310	—	3,310	—	—
Hoists, heavy cranes	48,883	—	—	,,	48,883	—	48,883	—	—
Joint line traffic and station expenses	2,298,181	33·88	778,708	66·12	1,519,473	46·46	1,067,627	19·66	451,846
	93,680	—	31,739	—	61,941	—	43,524	—	18,417
	2,391,861	33·88	810,447	66·12	1,581,414	46·46	1,111,151	19·66	470,263
	(100·00)	,,	(33·88)	,,	(66·12)	,,	(46·46)	,,	(19·66)
									66·12

Station and Terminal Traffic Expenses.

	Totals.	Passenger.	Goods.	Minerals.
	£	£	£	£
Salaries and wages	1,700,187	664,710	668,116	387,060
Fuel, lighting, &c.	212,896	80,730	83,661	48,505
Clothing	26,669	26,669	—	—
Printing, &c., $\frac{70,142l.}{2}$	35,071	13,299	13,781	7,991
Horses, vans	212,626	—	212,626	—
Agents' commission	3,310	—	3,310	—
Hoists, cranes	48,883	—	48,883	—
	2,239,642	765,408	1,030,377	443,856
Joint lines traffic expenses	93,680	31,739	43,524	18,417
	2,333,322	797,147	1,073,901	462,273
	Conveyance Traffic Expenses.			
	35,071	13,299	13,781	7,991
Proportion of printing, &c.	23,468	—	23,468	—
Wagon covers				
	58,539	13,299	37,249	7,991
	2,391,861	810,446	1,111,150	470,264

TABLE B.—LONDON AND NORTH WESTERN RAILWAY, 1894.
Number and Percentage of each Class of Passenger Carriages (used in the Apportionment of the Passenger Traffic Receipts and Working Expenses).

		Number.	Total Number.	Per Cent.
First class	First class	250		
	Saloon carriages	197		
	„ duplicates	111		
		558	1,115	20·80
	Composites 1,338			
	„ duplicates 334			
	1,672 ⅓	557		
		1,115		
Second class	Second class	224		
	„ duplicates	61		
		285	842	15·71
	One-third of composites	557		
		842		
Third class	Third class	2,198		
	„ duplicates	652		
		2,850	3,407	63·49
	One-third of composites	557		
		3,407		
			5,364	100·00

TABLE C.—*Passenger Traffic Receipts and Expenses per Class and per Vehicle*, 1894.

	Number and Percentage.		Gross Receipts.		Working Expenses.		Net Receipts.	
	Number.	Per Cent.		Per Carriage.		Per Carriage.		Per Carriage.
			£	£	£	£	£	£
First class	1,115	20·80	480,323	430·78	420,740	377·39	59,533	53·39
Second „	842	15·71	240,300	285·39	317,818	377·46	— 77,518	Loss. — 92·07
Third „	3,407	63·49	2,881,288	845·71	1,284,423	376·99	1,596,865	468·72
	5,364	100·00	3,601,911	671·49	2,023,031	377·15	1,578,880	294·34
Season tickets	....	....	240,093	44·77	120,047	22·38	120,047	22·38
Totals	5,364	....	3,842,004	716·36	2,143,078	399·53	1,698,927	316·72
Parcel vans	2,370	....	799,044	337·15	399,522	168·57	399,522	168·58
Mail „	39	....	189,179	4,850·76	94,590	2,425·38	94,589	2,425·38
Totals	7,773	....	4,830,227	....	2,637,190	....	2,193,038	....

TABLE D.—LONDON AND NORTH WESTERN RAILWAY, 1894. *Statement of the Working*

	Total Working Expenses.	Ratio of Apportionment.	Passenger Traffic. Total Expenses.	Station and Service Terminals.	Conveyance.
Permanent way, work, stations, &c.					
Salaries, 59,334*l.*— Per cent. £	£		£	£	£
Perm. way and work 75·51 = 44,803	44,803	Receipts	18,979	—	18,979
Stations, sidings, &c. 24·49 = 14,531	14,531	,,	6,155	6,155	—
100·00 59,334					
Repairs and renewals, stations, &c.....	230,041	Table A, Pt. III	97,450	97,450	—
,, ,, perm. way, &c..	528,541	,,	273,633	—	273,633
,, ,, works of line...	180,933	,,	76,647	—	76,647
Joint lines, 89,190*l.*	998,849	47·34	472,864	103,605	369,259
Permanent way and works, 75·51%	67,347	,,	31,882	—	31,882
Stations and sidings ..... 24·49%	21,843	—	10,340	10,340	—
100·00%	1,088,039	—	515,087	113,945	401,141
Traffic expenses.					
Salaries and wages.....	1,700,187	Table A, Pt. V	644,710	644,710	—
Fuel, lighting, &c.	212,896	,,	80,730	80,730	—
Clothing	26,669	,,	26,669	26,669	—
Printing { station, one-half £35,071	35,071	,,	13,299	13,299	—
Printing { conveyance..... 35,071	35,071	,,	13,299	—	13,299
70,142					
Horses, vans, &c.	212,626	,,	—	—	—
Wagon covers	23,468	,,	—	—	—
Agents' commission	3,310	,,	—	—	—
Hoists, cranes, &c.....	48,883	,,	—	—	—
	2,298,181	33·88	778,707	765,408	13,299
Joint line traffic expenses.....	93,680	,,	31,739	31,739	—
Total traffic expenses.....	2,391,861	33·88	810,446	797,147	13,299
Locomotive power.....	1,527,721	Table A, Pt. IV	630,963	—	630,963
Carriage repairs and renewal	319,236	To passngr.	319,236	—	319,236
Wagon ,, ,, ...	124,656	G. ⅜, M. ⅛	—	—	—
Total direct charges	5,451,513	—	2,275,732	911,092	1,364,639
	—	—	(100·00)	(40·04)	(59·96)
General charges	300,341	Receipts	127,224	—	—
Law and parliamentary.....	34,893	,,	14,781	—	—
Rates and taxes	329,481	,,	139,555	—	—
	664,685	Mean ratio	*281,560	112,737	168,823
Compensation, passengers.....	44,942	To passngr.	44,942	—	44,942
,, goods.....	49,302	,, goods	—	—	—
Government duty	33,280	,, passngr.	33,280	—	33,280
Mileage and demurrage	23,830	Ratio {1861 '71}	1,675	—	1,675
Totals	6,267,552	—	2,637,189	1,023,829	1,613,359
Ratios	—	—	(100·00)%	(38·82)%	(61·18)%

* Apportioned in mean

Expenses attributable to Station and Service Terminals, and of Conveyance, respectively.

Goods Traffic.				Mineral Traffic.			
Ratio of Apportionment.	Total Expenses.	Station and Service Terminals.	Conveyance.	Ratio of Apportionment.	Total Expenses.	Station and Service Terminals.	Conveyance
	£	£	£		£	£	£
Receipts	16,344	—	16,344	Receipts	9,480	—	9,480
,,	5,301	5,301	—	,,	3,075	3,075	—
Table A, Pt. III	83,930	83,930	—	—	48,661	48,661	—
,,	82,384	—	82,384	Table A, Pt. III	172,524	—	172,524
—	66,013	—	66,013	,,	38,273	—	38,273
25·43	253,972	89,231	164,741	27·23	272,013	51,736	220,277
,,	17,126	—	17,126	,,	18,339	—	18,339
,,	5,555	5,555	—	,,	5,948	5,948	—
—	276,653	94,786	181,867	—	296,300	57,684	238,616
Table A, Pt. V	668,116	668,116	—	Table A, Pt. V	387,360	387,360	—
,,	83,661	83,661	—	,,	48,505	48,505	—
,,	—	—	—	,,	—	—	—
,,	13,781	13,781	—	,,	7,991	7,991	—
,,	13,781	—	13,781	,,	7,991	—	7,991
,,	212,626	212,626	—	—	—	—	—
,,	23,468	—	23,468	—	—	—	—
,,	3,310	3,310	—	—	—	—	—
,,	48,883	48,883	—	—	—	—	—
46·46	1,067,626	1,030,377	37,249	19·66	451,847	443,856	7,991
,,	43,524	43,524	—	,,	18,417	18,417	—
46·46	1,111,150	1,073,901	37,249	19·66	470,264	462,273	7,991
Table A, Pt. IV	368,785	—	368,785	Table A, Pt. IV	527,972	—	527,972
—	—	—	—	—	—	—	—
⅔ goods	83,104	—	83,104	⅓ minerals	41,552	—	41,552
—	1,839,692	1,168,687	671,005	—	1,336,088	519,957	816,131
—	(100·00)	(63·53)	(36·47)	—	(100·00)	(38·92)	(61·08)
Receipts	109,565	—	—	Receipts	63,552	—	—
,,	12,729	—	—	,,	7,383	—	—
,,	120,184	—	—	,,	69,712	—	—
Mean ratio	*242,478	154,046	88,432	Mean ratio	*140,647	54,740	85,907
—	—	—	—	—	—	—	—
—	49,302	—	49,302	—	—	—	—
—	—	—	—	—	—	—	—
—	22,155	—	22,155	—	—	—	—
—	2,153,627	1,322,733	830,894	—	1,476,735	574,697	902,038
—	(100·00)%	(61·42)%	(38·58)%	—	(100·00)%	(38·92	(61·08)%

ratio of direct charges.

TABLE E.—*Merchandise Traffic.*

(Board of Trade Returns, 1894.)

Tonnage and Gross Receipts per Mile.

	Minerals.					Goods.			
	Miles Open.	Tonnage.	Tons per Mile.	Gross Receipts.	Receipts per Mile.	Tonnage.	Tons per Mile.	Gross Receipts.	Receipts per Mile.
		No.	No.	£	£	No.	No.	£	£
London and North Western Railway	1,892	28,839,389	15,243	2,414,686	1,276	8,392,077	4,436	3,926,719	2,075
North Eastern	1,620	34,923,806	21,558	2,481,240	1,532	9,427,599	5,820	2,322,342	1,434
Great Western	2,495	22,659,001	9,082	2,275,094	912	6,148,585	2,464	2,319,990	930
Midland	1,432	18,912,917	13,207	2,697,774	1,884	12,516,471	8,740	3,328,897	2,323
Taff Vale	121	13,069,116	108,009	459,698	3,799	721,087	5,959	72,070	596
Lancashire and Yorkshire	525	13,060,789	24,878	938,801	1,788	5,783,807	11,017	1,631,562	3,108
Manchester, Sheffield, & Lincoln	383	9,994,083	26,094	703,683	1,837	5,321,737	13,895	868,662	2,268
Great Northern	837	7,204,168	8,607	919,658	1,099	5,796,429	6,925	1,433,394	1,713
Barry	48	5,356,837	111,599	164,086	3,419	384,698	8,015	26,045	543
Banff	31	5,076,544	163,757	139,868	4,512	187,469	6,047	12,131	391
Great Eastern	1,104	3,565,219	3,229	501,460	454	5,223,172	4,721	1,158,309	1,049
Furness	134	3,428,016	25,582	216,114	1,613	554,880	4,141	84,513	631
Alexandra Dock Railway	3	3,505,284	1,168,429	18,972	6,324	119,205	39,735	1,341	447
North Staffordshire	193	3,346,620	17,340	227,623	1,179	1,186,383	6,147	223,007	1,156
	10,818	172,941,789	15,986	14,158,754	1,309	61,763,599	5,709	17,406,982	1,609
Other lines	3,718	29,077,056	7,821	1,586,357	427	15,454,216	4,157	2,783,436	749
England and Wales	14,536	202,018,845	13,898	15,745,111	1,083	77,217,815	5,312	20,190,418	1,389

Summary.

	Tonnage.	Per Cent.	Gross Receipts.	Per Cent.
			£	
Minerals	202,018,845	72·35	15,745,111	43·81
Goods	77,217,815	27·65	20,190,418	56·19
	279,236,660	100·00	35,935,529	100·00

TABLE F.—*Maximum Station and Service Terminals common to all the Railway Rates and Charges Order Confirmation Acts*, 1891 *and* 1892, *except*

Class.	Station Terminal at each End.	Maximum Terminals. Service Terminals. Loading.	Unloading.	Covering.	Uncovering.	Total Charges.
	Per ton.					
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
A	– 3	—	—	—	—	– 6
	Per ton.					
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
B	– 6	—	—	—	—	1 –
C	1 –	– 3	– 3	– 1	– 1	2 8
No. 1....	1 6	– 5	– 5	– 1·5	– 1·5	4 1
„ 2....	1 6	– 8	– 8	– 2	– 2	4 8
„ 3....	1 6	1 –	1 –	– 2	– 2	5 4
„ 4....	1 6	1 4	1 4	– 3	– 3	6 2
„ 5....	1 6	1 8	1 8	– 4	– 4	7 –
	7)9 –	6)5 4	6)5 4	6)1 1·5	6)1 1·5	7)30 11
Average	1 3·43	– 10·67	– 10·67	– 2·25	– 2·25	4 5

Summary.

	s. d.	
Average station terminal one end	1 3·43	per ton
„ „ other end	1 3·43	„
„ loading	– 10·67	„
„ unloading	– 10·67	„
„ covering	– 2·25	„
„ uncovering	– 2·25	„
	4 8·70	„

TABLE G.—MIDLAND RAILWAY, 1894.

Passenger Traffic Receipts and Expenses per Class and per Vehicle.

	Number and Percentages.			Gross Receipts.		Working Expenses.		Net Receipts.	
	Number.	Total.	Per Cent.		Per Carriage.		Per Carriage.		Per Carriage.
				£	£ dec.	£	£ dec.	£	£ dec.
First class	283	738	24·64	200,187	271·26	311,278	Loss. − 421·78	Loss. − 111,091	150·52
Half composite, $\frac{2}{2}\frac{1}{0}$	455								
Second class	Nil	Nil	Nil	—	—	—	—	Nil	—
Third class	1,802	2,257	75·36	1,875,971	831·19	952,027	421·80	923,944	409·39
Half composite $\frac{2}{2}\frac{1}{0}$	455								
	—	2,995	100·00	2,076,158	—	1,263,305	—	812,853	—
Season tickets	—	—	—	174,717	—	87,358	—	87,359	—
Totals	—	—	—	2,250,875	751·55	1,350,663	450·98	900,212	300·57
Parcels	—	—	—	535,020	321·91	267,510	160·95	267,510	160·96
Mails	—	—	—	56,938	612·24	28,469	306·12	28,469	306·12
Totals	—	2,995	100·00	2,842,833	—	1,646,642	—	1,196,191	—

TABLE H.—LONDON AND NORTH WESTERN RAILWAY.

Goods Traffic Receipts and Working Expenses.

	Goods and Live Stock Receipts.	Goods and Live Stock Expenses.	Net Receipts.	Per Train Mile.	Per Full Train Mile.	Receipts per Ton per Mile (Net Load 120 Tons).	Goods Receipts per Ton.		Goods Tonnage.
	£	£	£	*d.*	*d.*	*d.*	*s.*	*d.*	
1860....	1,548,279	676,228	872,051	102·98	108·41	0·9034	12	2·89	2,529,871
'61....	1,601,929	740,472	861,457	98·50	103·68	0·8640	12	2·62	2,621,995
'62....	1,712,836	769,467	943,369	111·43	117·29	0·9774	12	11·04	2,652,886
'63....	1,925,345	832,371	1,092,974	109·00	114·78	0·9565	11	7·49	3,035,895
'64....	2,098,079	890,328	1,207,751	105·00	110·52	0·9210	10	9·28	3,894,698
'65....	2,291,669	968,397	1,323,272	105·37	110·92	0·9243	10	1·03	4,254,232
'66....	2,437,354	1,033,213	1,404,141	108·93	114·66	0·9555	10	5·42	4,664,072
'67....	2,423,436	1,048,676	1,374,760	101·44	106·78	0·8898	10	4·14	4,685,066
'68....	2,544,473	1,032,999	1,511,474	109·19	114·93	0·9578	10	0·62	5,063,060
'69....	2,561,764	1,014,717	1,547,047	105·71	111·27	0·9273	9	0·33	5,223,618
1870....	2,699,268	1,061,793	1,637,475	102·91	108·32	0·9027	9	4·06	5,781,502
'71....	3,005,421	1,121,871	1,883,550	105·80	111·36	0·9280	8	9·40	6,360,728
'72....	3,077,184	1,237,514	1,819,670	97·98	103·13	0·8594	9	1·15	6,765,361
'73....	3,263,077	1,454,456	1,808,621	98·86	104·06	0·8672	8	9·44	6,947,446
'74....	3,407,620	1,573,887	1,833,733	102·15	107·53	0·8961	9	1·86	6,978,217
'75....	3,411,723	1,572,543	1,839,180	97·37	102·49	0·8541	8	11·52	7,138,504
'76....	3,420,264	1,552,550	1,867,714	97·43	102·55	0·8546	9	6·67	7,158,858
'77....	3,439,303	1,547,354	1,891,949	98·74	103·94	0·8862	8	8·34	7,425,688
'78....	3,557,916	1,562,536	1,995,380	104·43	109·92	0·9160	9	9·38	7,274,288
'79....	3,506,271	1,487,329	2,018,942	102·43	107·82	0·8985	9	0·41	7,302,607
1880....	3,705,813	1,533,628	2,172,185	97·68	102·82	0·8568	9	5·31	7,857,122
'81....	3,821,491	1,593,583	2,227,908	97·45	102·57	0·8548	8	11·36	8,114,568
'82....	3,897,081	1,599,640	2,297,441	99·54	104·77	0·8731	8	8·40	8,367,722
'83....	3,911,799	1,615,500	2,296,299	97·13	102·24	0·8520	9	1·60	8,566,080
'84....	3,853,011	1,620,046	2,232,965	100·00	105·96	0·8830	9	0·49	8,523,681
'85....	3,829,743	1,616,753	2,212,990	100·29	105·57	0 8800	9	3·69	8,228,985
'86....	3,744,735	1,579,888	2,164,847*	99·38	104·60	0·8717	9	6·77	7,829,337
'87....	3,751,917	1,581,801	2,170,116*	97·93	103·08	0·8590	9	9·46	7,666,697
'88....	3,917,206	1,649,877	2,267,329	100·20	105·47	0·8789	9	9·16	8,024,305
'89....	4,094,265	1,737,621	2,356,644*	99·41	104·63	0·8719	9	10·26	8,294,397
1890....	4,228,429	1,808,065	2,420,364*	100·04	105·31	0·8775	9	11·08	8,520,802
'91....	4,297,829	1,842,664	2,455,165*	99·85	105·10	0·8759	9	10·14	8,585,960
'92....	4,260,964	1,849,694	2,411,270*	97·99	102·94	0·8578	10	0·80	8,463,668
'93....	4,059,412	1,755,254	2,304,158*	100·91	106·23	0·8852	10	2·42	7,958,230
'94....	4,160,131	1,832,812	2,327,319	99·85	105·10	0·8759	9	10·97	8,392,077
'95....	4,234,979	1,879,490	2,355,489*	103·22	108·65	0·9054	9	11·33	8,497,375

* Board of Trade Returns, train mileage.

TABLE J.—LONDON AND NORTH WESTERN RAILWAY.

Passenger Traffic Receipts and Working Expenses per Passenger per Train Mile.

FIRST CLASS.

Year.	Train Miles.	Gross Receipts.	Per Passenger.	Per Train Mile.	Working Expenses.	Per Passenger.	Per Train Mile.	Net Receipts.	Per Passenger.	Per Train Mile.
	Number.	£	*d.*	*d.*	£	*d.*	*d.*	£	*d.*	*d.*
1860....	7,208,942	594,956	74·69	19·81	264,550	33·31	8·81	330,456	41·48	11·00
'63....	8,825,737	645,962	64·73	17·56	264,484	26·50	7·19	381,478	38·23	10·37
'65....	10,253,026	771,263	64·35	18·05	277,747	23·19	6·51	493,516	41·16	11·54
'67....	10,802,332	764,645	62·24	16·99	299,663	24·39	6·66	464,982	37·85	10·33
1870....	12,447,546	701,713	61·71	13·53	317,995	27·97	6·13	383,718	33·74	7·40
'73....	14,281,208	750,500	59·93	12·61	409,380	32·69	6·88	341,120	27·24	5·73
'75....	14,929,335	729,647	53·25	11·73	475,670	34·71	7·65	253,977	18·54	4·08
'77....	15,981,878	645,518	49·98	9·69	467,789	36·22	7·02	177,729	13·76	2·67
1880....	16,702,894	564,152	52·50	8·11	415,293	38·65	5·97	148,859	13·85	2·14
'83....	18,765,729	559,485	55·21	7·16	468,778	46·26	6·00	90,707	8·95	1·16
'85....	19,642,321	497,447	55·89	6·08	446,172	50·13	5·45	51,275	5·76	0·63
'88....	19,875,824	480,780	60·23	5·81	469,866	58·86	5·67	10,914	1·37	0·14
1890....	21,611,499	522,852	65·52	5·81	438,300	54·93	4·87	84,552	10·59	0·94
'94....	21,467,625	480,323	60·93	5·37	462,962	58·73	5·18	17,361	2·20	0·19

SECOND CLASS.

	Number.	£	*d.*	*d.*	£	*d.*	*d.*	£	*d.*	*d.*
1860....	7,208,942	685,504	26·47	21·16	288,607	12·02	9·61	346,897	14·45	11·55
'63....	8,825,737	700,697	24·27	19·05	350,204	12·13	9·52	350,493	12·14	9·53
'65....	10,253,026	806,977	22·98	18·89	327,369	9·32	7·66	479,608	13·66	11·23
'67....	10,802,332	818,875	21·70	18·19	360,284	9·55	8·00	458,591	12·15	10·19
1870....	12,447,546	818,176	21·96	15·77	329,332	8·84	6·35	488,844	13·12	9·42
'73....	14,281,208	557,200	24·40	9·06	337,330	14·77	5·67	219,870	9·63	3·69
'75....	14,929,335	549,295	18·79	8·83	384,922	13·16	6·19	164,373	4·63	2·64
'77....	15,981,878	516,405	21·93	7·76	380,386	16·15	5·71	136,019	5·78	2·05
1880....	16,702,894	436,501	23·90	6·27	348,375	19·07	5·01	88,126	4·83	1·27
'83....	18,765,729	394,596	23·35	5·05	344,147	20·36	4·40	50,449	2·99	0·65
'85....	19,642,321	359,302	23·51	4·39	326,048	21·33	3·18	33,254	2·18	0·41
'88....	19,875,824	328,771	23·68	3·97	343,364	24·73	4·15	− 14,593	−1·05	−0·18
1890....	21,611,499	331,566	23·93	3·68	339,975	24·53	3·78	− 8,409	0 60	−0·10
'94....	21,467,625	240,300	19·69	2·69	349,670	28·65	3·91	−109,370	−8·96	−1·22

THIRD CLASS.

	Number.	£	*d.*	*d.*	£	*d.*	*d.*	£	*d.*	*d.*
1860...	7,208,942	506,005	16·27	16·84	225,389	7·25	7·50	280,616	9·02	9·34
'63...	8,825,737	621,330	14·70	16·90	289,532	6·85	7·87	331,798	7·85	9·03
'65...	10,253,026	702,322	12·94	16·44	350,984	6·47	8·22	351,388	6·47	8·22
'67...	10,802,332	761,800	12·76	16·93	450,327	7·55	10·01	311,473	5·21	6·92
1870....	12,447,546	896,120	11·52	17·28	545,904	7·02	10·53	350,216	4·50	6·75
'73...	14,281,208	1,651,269	12·02	27·75	822,999	5·99	13·83	828,270	6·03	13·92
'75...	14,929,335	1,762,875	12·51	28·64	944,032	6·70	15·18	818,843	4·81	13·16
'77...	15,981,878	1,861,559	11·74	27·96	972,724	6·14	14·61	888,835	5·60	13·35
1880...	16,702,894	1,943,764	11·49	27·93	917,678	5·42	13·19	1,026,086	6·07	14·74
'83...	18,765,729	2,232,557	11·24	28·55	1,011,822	5·09	12·94	1,220,735	6·15	15·61
'85..	19,642,321	2,267,175	11·32	27·70	943,824	4·71	11·53	1,323,351	6·61	16·17
'88 ..	19,875,824	2,433,485	11·33	29·38	993,949	4·63	12·00	1,439,536	6·70	17·35
1890....	21,611,499	2,730,397	11·85	30·32	1,266,045	5·49	14·06	1,464,352	6·36	16·26
'94....	21,467,625	2,881,288	10·62	32·21	1,413,147	5·21	15·80	1,468,141	5·41	16·41

Discussion *on* Mr. Price-Williams's Paper.

Mr. J. S. Jeans had not had the opportunity of quite mastering the methods adopted by Mr. Price-Williams, and was not sure if they were correct. It seemed to him that the gist of the paper was contained in the paragraph in which he said that his method afforded the means of determining within narrow limits of error the expenses properly attributable to each of the three great branches of railway business, namely, the passenger, goods and mineral traffic, and also of determining the cost of conveyance and terminal expenses incident to each. If Mr. Price-Williams had put them in possession of a reliable method for ascertaining these data he had rendered the traders of the country, as well as the railway companies, a great service. He had ascertained that in respect of mineral traffic the gross receipts amounted to 0·42*d.* per ton-mile, the cost to 0·26*d.*, and the profit to 0·15*d.* If those figures were correct, some of them had been doing the railway companies of this country a very considerable injustice for years past. In a protracted discussion on the subject before the select committee of which Lord Balfour of Burleigh was chairman, and the present chairman (Sir Courtenay Boyle) a member, that question was raised again and again; but he did not remember that a suggestion was ever made that the average gross receipts were so low as the figures now given. In the last report of the Inter-State Commerce Commission of the United States the average ton-mile rates for merchandise and minerals in this country were stated at nearly 2*d.* per ton-mile. He did not know how that figure was arrived at, but they presumably had some good reason for adopting it. He had recently been making inquiries in several of the leading iron-making districts of this country with regard to the average rates charged for iron and iron-making materials, but he did not get a single figure coming near the one given by Mr. Price-Williams. On the contrary, he found that even in long haul traffic, such as that between Birmingham, or Dudley, or Wolverhampton and London, there was scarcely a case where the ton-mile rate for manufactured iron or steel or even pig iron was under 1*d.* He had in his possession a great many data which were submitted to the select committee, showing that for coal traffic the average ton-mile rates were nearer 1*d.* than the figure now given. The evidence of the paper as to station terminals must be regarded as satisfactory, as it showed how near the statutory limit had come to the actual cost as affecting railway companies. In view of the fact that English railway companies never gave the ton-mile rates, which were given in practically every important industrial country except their own, the great merit of the paper, assuming its accuracy, was that it gave the ton-mile rates without troubling either the Board of Trade or the companies. That was a most important

fact, and if the author had been as accurate in the estimates he had placed before them as he was able and painstaking, the railway companies and traders would owe him a debt of gratitude.

Mr. W. M. Acworth fully agreed with the author of the paper that railway companies ought to give fuller information in their annual reports, and if they would copy the example of Mr. Price-Williams and give not only columns of figures but graphic statistics that would be even better. He could not, however, refrain from suggesting a doubt whether the author was justified in asking for those further figures, for, if his paper was correct, there was no need to trouble the railway companies or the Board of Trade for ton-mile statistics or anything else, seeing that they could work them out for themselves from the existing data. The important question therefore was, could the method adopted by the writer of the paper be relied on? Was it possible to apportion the expenses between passengers and goods? If not, *a fortiori*, it was not possible to apportion expenses between the different classes in the case of passengers or between conveyance and terminals in the case of goods. Some of the railway companies of America used to give the expenses *attributable* to passenger traffic and those *attributable* to goods traffic; there was a set of recognised conventions as to the basis on which the apportionment should be made; and the statistics of the Inter-State Commerce Commission, were drawn up on that basis. It had, however, recently been decided, after careful discussion by the statisticians of the Inter-State Commerce Commission and representatives of the great railway companies and of the various State Railway Commissions, to discontinue the attempt to distinguish the expenses attributable to passengers from those attributable to goods, the reason given being that these figures were necessarily only an estimate, but that they were constantly treated as an absolute fact, and arguments were based upon them and deductions drawn from them which they were not intended or calculated to support. Further, in no other country, though in almost every case the fulness of their railway statistics was such as to put us to shame, was an attempt made to apportion the expenses between goods and passengers. The point might also be illustrated experimentally from Mr. Price-Williams's own paper. For instance, on p. 12, Table 7, the passenger traffic expenses were set down as 810,000*l.*, and of that all but 13,000*l.* was attributed to station expenses. But surely a large part of the traffic expenses consisted of guards' wages and the cost of signalmen, who were attributable in the main to conveyance; only two signalmen, one at each end of a journey, however long, could be reckoned as belonging to station service. Another instance might be taken in the opposite direction: compensation to passengers, amounting to 44,900*l.*, was attributed by Mr. Price-Williams entirely to conveyance. But passengers were really far more likely to be injured at stations than when travelling in the train. He mentioned these instances merely to show how arbitrary the distinction was, and how differently different individuals would estimate the apportionment of the gross sum. Even if the expenses between different

classes of traffic could be distributed with accuracy, what was the practical good of it? It might be proved, for instance, that second class passengers were carried at a loss of so many thousands a-year by attributing to them their full share of the cost of every kind that they incurred. But a railway man would argue that his second class passengers paid him 100,000*l.* a-year more than they would pay if they travelled third class, so that if it only cost him 80,000*l.* more to carry them in second class carriages than in third, he made 20,000*l.* a-year by the traffic. Therefore even if by averaging the expenditure over all three classes it was proved that the second class passengers yielded a minus quantity of profit, that still did not prevent the railway man having an interest in carrying them, still less did it prevent its being in the public interest that those who wished to go second class and liked to pay for it should be allowed to do so. He confessed therefore that not only was he convinced it was impossible to allot the working expenses between goods and passengers, and still more to divide them further between different classes of passengers, different classes of goods, and cost of terminals and conveyance, but that, even if it were possible, he believed the division would be of no practical utility.

Mr. C. J. Owens, referring to Mr. Price-Williams' statement that for a certain period the London and North Western gave certain statistics, but then discontinued them, said that this company was progressive and not retrograde; and had they believed that the figures they were giving were trustworthy and valuable, no doubt they would have continued them. But, speaking with a lifelong experience of railway work, he said most emphatically that the division of the expenses of the working of a railway as between goods and passenger traffic, and still further as between various classes of the two main descriptions of traffic, was an impossibility. The same staff at all the small stations on a railway such as that he represented, which were 60 or 70 per cent. of the whole, did all the work there was to be done, and how could the expenses of the staff at such stations be divided between the goods element and the passenger element? Then, again, how were the important expenses of signalling to be distributed? Certainly not in the ratio of the receipts, because the passenger traffic had to be specially protected in accordance with the regulations of the Board of Trade. Further on in the paper the author mentioned losses incurred in the working of the passenger traffic. In this matter he fully agreed with Mr. Acworth. They were told on p. 4 that there was an actual loss of 2*s.* per first class passenger, or 1$\frac{3}{5}$*d.* per train-mile. Such a statement would assume that if they did not carry these first class passengers they would effect a great saving. But how could they allot to this particular class of traffic the expenses of signalling, running the trains, locomotives, stations, and staff? They were all permanent expenses, and would be just the same whether the whole traffic was first class or divided into three classes. If the expense of providing improved (*i.e.*, first or second class) travelling accommodation was more than counterbalanced by the increased rates charged, then those classes of

traffic would be worked at a profit. On p. 15 was given the average station terminal, which was arrived at by dividing the terminals of all the various classes and dividing them by the number of classes. This would be a perfectly accurate assumption if they carried 1,000 tons in each of the various classes. But, dealing with goods traffic, *i.e.*, Class C and classes 1 to 5, 60 per cent. of the total tonnage would be in Class C, which gave the lowest terminal, and somewhat less than 1 per cent. would be in class 5, which gave the highest terminal. By the method adopted therefore a figure was obtained which was wide of the actual fact. He agreed with Mr. Price-Williams when he referred to the inadequate allowances in some cases made for terminal services. When this matter came before the Board of Trade the question was discussed as to what was to be allowed for loading furniture. That came in class 5, the figure being *1s.* 8*d.* per ton, which was accepted by the railway companies, although he was convinced that none of the large furnishing houses could perform the service for that amount. The terminal services and conveyance rate were treated separately; but what railway companies aimed at in the division of the rates was that in the aggregate they should get what was fair. In some instances they did not get what was fair in terminals, but they got compensation in the conveyance rate, and *vice versâ*. Their main endeavour had been to maintain the *status quo*.

The CHAIRMAN (Sir COURTENAY BOYLE, K.C.B.) wished to safeguard himself by saying that if he did not refer in detail to the majority of the points mentioned in the paper, he must not be held to acquiesce entirely in the accuracy of the arguments set forth with so much care and labour. The question of railway rates was very full of difficulties and intricacies, with which a prolonged study could alone enable an expert to grapple. Just as an instance he might mention that in one place the author said that minerals came under the category of A, or the lowest class of merchandise traffic, but he thought the last speaker would bear him out that a good many minerals came under Classes B and C in the classification. Then on p. 14 Mr. Price-Williams calculated the mean of the rates for distances within the limits given, and worked out the mean for 20 miles at 19*d.*, for 50 miles at 42·5*d.*, and for 100 miles at 50*d.* But he ventured to think that Mr. Price-Williams did not quite appreciate the effect of the schedule to the Confirmation Act of 1891. The charge for the first 20 miles ran through the whole of the conveyance, and consequently it was only for 30 miles not for 50 that the rate was 0·85*d.*, and therefore that 42·5*d.* in the third column should be 44·5*d.*, and the 50*d.* ought to be 69·5*d.* One of the most important suggestions was that the railway companies would do statisticians a most important service if they could tell them what was the cost of a ton-mile, and this point had been urged by the Board of Trade as well as by traders. Undoubted difficulties had been urged, but he thought that if it was understood that the figure given by the railway companies for a ton-mile was an estimate and not an arithmetical fact on which

argument might be based, some more information might be given than was given at present. He would suggest to the able representatives of the railways that they should once more consider whether it was not possible to give an estimate of what the cost of a ton-mile was. The author of the paper doubted whether any adequate allowance had been made in the rates and charges authorised in respect of goods on mineral traffic for terminal expenses. They were told repeatedly that the terminal allowances were extremely high and bore hardly on the trader. They were also told by the railway companies that the full maximum powers of charging terminals were very seldom exercised. Lastly, he would say that railway statistics, like other statistics, must be used with a knowledge of what they really were. They must be treated as more or less estimates, useful as a guide but not indicating a perfectly accurate fact. He concluded by moving a cordial vote of thanks to the writer of the paper for the extreme care and patience he had taken in its compilation.

The following reply to the various criticisms made on the paper during the discussion was subsequently forwarded to the Editor by the author.

Mr. Price-Williams wished to express his appreciation of the value of the criticisms upon the paper. As regards Mr. Acworth's observation, that if the author had discovered a method of getting the requisite information for the apportionment of the expenses between the passenger and goods traffic, what need was there to trouble the railway companies for further information, it was only necessary for him to point out that it was the absence of this fuller and more detailed information in the railway companies' reports, which obliged his having recourse to the method he had adopted. That the necessary information could be furnished by the railway companies was admitted and exemplified in the case of the London and North Western Railway reports during a long period of years, and in a still more complete manner in the Government annual reports of the Belgian railways, the reports of some of the American railway companies (notably the New York Central and Hudson River), and also in the admirable "administration reports" of the Indian railways, for which, in the latter case, they were largely indebted to a distinguished Fellow of this Society, Sir Juland Danvers. In all the railway reports alluded to, the ton-mile and the passenger-mile units were important features, and a great step would be gained were the railway companies in this country to furnish in their reports the requisite data to enable these important factors to be determined.

It must be admitted that the results arrived at, even with the aid of the fullest information, would necessarily be, as Sir Courtenay Boyle had pointed out, only approximately correct; sufficiently so, however, to admit of reliable conclusions being arrived at as to the relative cost of working on different railways,

due regard being had to the nature of the traffic and the character of the respective railways, and still more reliable when applied for the purpose of determining the relative working expenses attributable to each of the three great branches of traffic on a particular railway system like that of the London and North Western, where any slight errors in the apportionment such as those alluded to in the discussion would, as was admitted by the late Sir George Findlay, be entirely neutralised.

No one acquainted with the working of American railways and the admitted absence of anything like uniformity in the mode of dealing with their accounts, would be at all surprised to learn from Mr. Acworth that the "Inter-State Commerce Commission" which was instituted in 1887 for the development of railway statistics under Federal control and for the establishment of a uniform system of accounts, had decided to discontinue their attempts to distinguish the expenses attributable to passenger from those attributable to goods traffic.

That this decision was the inevitable result of their inability to get the American railway companies to adopt a uniform system of accounts there could be little doubt, the Commissioners however had evidently not abandoned the hope of doing so, as in their report they expressed their opinion "that uniformity of accounting would never be obtained in this manner, and that the Commission would ultimately be obliged to exercise the power which Congress had reposed in it to prescribe for the carriers (*i.e.*, the railway companies) a uniform system of accounts, and the manner in which such accounts were to be kept."

The few following extracts from the Commissioners' report for 1892, to which allusion had been made by Mr. Acworth, afforded some idea of the great and exceptional difficulties encountered in their efforts to bring this about, and sufficiently explained the reasons which at present rendered it so difficult to institute any reliable comparisons as to the relative cost of working the various railway systems in the United States, still more so to attempt accurately to apportion the working expenses as between the passenger and goods traffic.

* * * * *

"So far as the general principles of accounting were concerned there appeared to be substantial harmony, but there existed a sufficient diversity in matters of detail to destroy any comparisons which might be made on the basis of the statistics collected by the several States. The Convention, recognising the necessity of uniformity, passed a resolution to the effect that 'it is the sense of this Convention that a uniform method of collecting and publishing statistics, both as to time and matter, should be adopted.'"

* * * * *

"The chief occasion for uncertainty at the present time is found in the fact that the carriers (the railway companies) do not themselves follow uniform methods of accounting."

* * * * *

"It is a noteworthy fact that the percentages of items of cost of sub-classes of operating expenses are not, in many cases, the

same when compiled from the official reports and from the reports from railways to stockholders."

* * * * *

"It is no secret that under present conditions it is exceedingly difficult for the shipper (freighter) whose rights are disregarded by a railway corporation to secure quick and speedy relief; and on this occasion shippers conceive their interests to depend upon the good will of railway managers rather than upon the protection of commissions or courts, and consequently are reluctant to bring cases for the defence of their established rights."

* * * * *

"In order that the law against discrimination in rates may become effective there must be created a uniformly organized and uniformly administered railway system. Managers cannot be allowed the liberty of adopting unusual methods of business, nor lawyers the right of urging before commissions peculiar policies of management as a defence for unusual methods."

* * * * *

"Now the first step towards the establishment of uniformity of management is to establish uniformity in accounts, and to take from railway officials the right of adjusting their accounts in an arbitrary manner. The railway laws of this country are not at present capable of easy execution, because of the difficulty of securing evidence against 'discrimination'—a difficulty which in large measure is due to the numberless and complex methods by which railways do their business."

* * * * *

"The question involved in this controversy is not simply commercial in character; it is at the same time a question of public policy, and as such, like all questions of a political character, demands the fullest and completest knowledge respecting it. *If the theory that railway rates should bear some relation to cost of service be accepted, it is essential that the facts pertaining to cost of service should be known.*"[11]

* * * * *

"It will probably be said that a bureau of statistics and accounts outlined in the above recommendations contemplates an organization on a basis so broad as to preclude successful administration. The reply to this objection is that it is not magnitude of work assigned to a bureau which makes it difficult for administration, but complexity in the elements with which the bureau is called upon to deal; and provided only there be established uniformity in the general accounting of corporations engaged in inter-state traffic, and provided that Congress is willing to grant ample means and authority, there is no reason in the nature of the case why the plan outlined in this report may not be realized."

* * * * *

The main difficulty experienced by the Inter-State Commerce Commission had in this country been already surmounted, as all the railway companies' reports, and the returns they were required

[11] The italics are my own.—P.-W.

to furnish to the Board of Trade—incomplete as they admittedly were—had at least the essential feature of uniformity, and afforded a great amount of most valuable and reliable information which, with some amplifications, would enable much closer approximations to be arrived at in the separate determination of the passenger and goods traffic expenses. Amongst the most needed of these requirements was a statement showing the average number of vehicles in passenger and goods trains respectively, the average number of miles each passenger and ton of goods was carried, so that the passenger-mile and the ton-mile units might be ascertained. The railway companies' reports should also give separately the main well defined items of the working expenses attributable to the passenger and goods traffic respectively, as was for many years furnished in the reports of the London and North Western Railway Company.

As regards the few minor and indeterminate items to which reference had been made by Mr. Acworth and Mr. Owen, their entire omission or arbitrary apportionment would in no way appreciably affect the relative ratios of the large aggregate amounts which constituted the main items. Another and much needed requirement was a statement separately distinguishing the goods, mineral, and mixed train mileages, any difficulty in the apportionment of the latter being effectively dealt with as in the case of the minor and indeterminate items already alluded to. The goods and mineral train mileage, inextricably mixed up as it was at present, was utterly valueless when used as a factor or common divisor for correctly ascertaining either the goods or mineral receipts and expenses per train mile, inasmuch as 90 per cent. of the mineral trains were hauled back empty on their return journey; in other words 45 per cent. of the entire mineral train mileage was unremunerative, and the cost of its working solely attributable to the mineral traffic, whereas in the case of the goods trains the empty return mileage on an average did not exceed 5 per cent. of the entire goods mileage, so that altogether 25 per cent. of the combined mileages of the goods and minerals was non-paying, $22\frac{1}{2}$ per cent. being solely attributable to the mineral, and only $2\frac{1}{2}$ per cent. to the goods traffic.

The combined goods and mineral train mileage of the London and North Western Railway for the year 1894 was roundly twenty million miles (19,999,222). From an analysis of the respective tonnage of the goods and minerals the average "leads," &c., it would appear that the mileages of the goods and minerals, including in each case, the empty mileages, were about equal.[12]

[12] *Estimated goods train miles—*

		Trains.		Miles Lead.		Train Miles.
Tonnage	$\frac{8,392,077}{120 \text{ tons}}$	= 69,917	×	150	=	10,487,596
Net load						

Estimated mineral train mileage—

Tonnage	$\frac{28,839,389}{250 \text{ tons}}$	= 115,358	×	90·6	=	10,451,435
Net load						
				Total train miles	=	20,939,031

Assuming this to be the case, the full and empty train mileages in each case would be as follows :—

	Train Mile.	Train Mile. Full Trains.	Train Mile. Empty Trains.	Total Train Mile Percentage of Empties.
Total goods train miles	10,000,000	—	—	—
Full trains	5,000,000	5,000,000	—	—
„ return 90 per cent....	4,500,000	4,500,000	—	—
Empty „ 10 „	500,000	—	500,000	—
	10,000,000	9,500,000	500,000	2·5
Total mineral train miles	10,000,000	—	—	—
Full trains	5,000,000	5,000,000	—	—
„ return 10 per cent.....	500,000	500,000	—	—
Empty „ 90 „	4,500,000	—	4,500,000	—
	10,000,000	5,500,000	4,500,000	22·5
Totals	20,000,000 (100%)	15,000,000 (75%)	5,000,000 (25%)	25·00 —

The railway rates charged per ton per mile had reference only to the mileage the traffic was forwarded, no account being taken of the large amount of the empty return mileage, more especially in the case of the mineral traffic, the effect therefore of employing this large and unremunerative mileage as a factor in determining the receipts or expenses per train mile of either the goods or mineral traffic was unduly to diminish both, particularly in the case of the mineral traffic, as would be seen from a reference to Table A, Part II, in the appendix to the paper, where the depreciative effects of the mileage of the empty return trains had been eliminated, both in the case of the goods and mineral traffic.

As bearing upon the important question of the apportionment of the passenger and merchandise traffic expenses, it should be mentioned that the New York Central Railway Company's annual reports, like those of the London and North Western, had for many years given these expenses separately and continued to do so. A comparison in the case of these two great railway systems for the year 1894 conclusively showed that, although the working expenses severally attributable to the passenger and merchandise traffic had been independently worked out and in much detail, the ultimate ratios of apportionment in both cases corresponded almost exactly with the ratios the receipts from each class of traffic bore to the entire traffic receipts of each railway, and afforded the strongest testimony not only to the soundness of the economic principle that the working expenses properly attributable to each branch of railway traffic should have close, if not exact, relation to the gross earnings in each case, but to the fact that they disclosed that the traffic was properly and economically worked;

the New York Central passenger receipts, for instance, in 1894 amounted to 37 per cent. of the gross revenue of that company, and the expenses attributed to it to almost exactly the same percentage of the total working expenses; while in the case of the London and North Western the passenger traffic receipts for the same year were 42·36 per cent. (Table A) and the working expenses attributed to it amounted to almost exactly the same percentage of the total expenses, viz., 42·08 per cent. (Table A, Part II, Appendix).

The expenses severally attributable to the goods and mineral traffic were not given in the New York Central reports, the mineral traffic expenses however of the London and North Western Railway in 1894, as worked out in detail in the paper, amounted to just 23½ per cent. (23·56 per cent.) of the aggregate working expenses, somewhat in excess of the ratio which the mineral receipts bore to the total traffic receipts for the year, viz., 21·16 per cent. (Table A, Part I), and were due to the increased cost of working the large amounts of the non-paying empty return mineral trains.

Full particulars were given in the tables appended to the paper of the method adopted in the apportionment of the working expenses of the London and North Western Railway: it might, however, be desirable to explain that the main items under the head of "Permanent Way, Works, &c.," relating to the maintenance and renewal of the line had been apportioned as between the passenger and merchandise traffic in the ratios of the respective train mileages, and as between the goods and minerals in the ratios of the gross tonnages of the respective trains.

In the case of the locomotive expenses, which constituted on an average about one-fourth of the entire working expenses of a railway, the wages item of the running expenses was apportioned in the ratios of the passenger and goods train mileages, divided by the average speed of the respective trains: the fuel consumed by the locomotives (the cost of which amounted to nearly one-fourth of the entire locomotive expenses) in the ratios of the respective train mileages, multiplied by the average consumption per mile, the apportionment of the locomotive expenses as between goods and minerals being in the respective ratios of the gross tonnages hauled by each class of train. The remaining items of the working expenses where "wear and tear" was not concerned were allocated in the several ratios of the receipts derived from the respective classes of traffic.

The apportionment of the working expenses of a railway under the respective Board of Trade headings of "Station and Service Terminals" and "Conveyance" was a much easier matter, inasmuch as the chief items given in the companies' reports were in most cases chargeable almost in their entirety either under one or other of these headings, notably the "Permanent Way," "Works of Line," &c. In the case of station and signal repairs and renewals, where the cost of the labour was not given separately, it was estimated to equal that of material, in accordance with what obtained in all properly maintained structures subject to

"wear and tear," as illustrated in the case of locomotive repairs and renewals, where during a period of years the average cost of the labour and materials used had been found to correspond almost exactly,[13] the slight diminution of late years in the item of labour being attributable to the improved quality and greater durability of the material—steel, and the consequent saving in the cost of the labour expended in its repair.

As regards the apportionment of the large items of salaries and wages under the head of "traffic expenses," and the omission under the head of "conveyance" of the wages of the guards of passenger and goods trains, to which Mr. Acworth had drawn attention, it should be explained that the omission of this small and indeterminate amount (which, strictly speaking, should not be entirely attributed to "conveyance," inasmuch as a portion of their services were required at stations, more especially in the case of goods and minerals trains) would not appreciably affect the results given in Table 7. The same remark applied to the indeterminate amount of the portion of the wages of signalmen, which, as Mr. Owen pointed out, should also be attributed to "conveyance." The amount, however, would be very small, and limited to the cost of their services whilst occupied in signalling "through running" trains, their services whilst engaged in signalling "stopping" trains being partly attributable to "station" services and partly to "conveyance," and wholly attributable to stations whilst signalling the engines engaged in shunting and marshalling trains in station yards and within the limits of the distant signals.

On the other hand, and as a set off against any such omissions in the apportionment of minor and indeterminate items of expenses properly attributable to "conveyance," it should be pointed out that the locomotive expenses connected with the shunting and marshalling of trains, &c., at stations, and chargeable to "station services," had, owing to the impossibility of determining their cost since the railway companies' reports no longer furnished the shunting mileage as they used to do with the other items of locomotive expenses, been wholly attributed to "conveyance."

It was scarcely necessary after what he had already said in regard to the inappreciable effect of the apportionment of these minor items of expenses, to refer to Mr. Acworth's contention, that a portion of the small item of compensation to passengers for accidents occurring at stations should be attributed to the latter: he might however state that an analysis of the Board of Trade Returns, showed that out of the 1,489 passengers either injured or killed on the railways in the United Kingdom during 1895, the accidents which occurred to 1,192, or 80 per cent. of the passengers, were due "to the movement of the trains," while of those which happened at stations to the remaining 297 passengers, 38 only, or just 2 per cent. of the entire number of passengers, were injured by falling over packages, or being struck by barrows, &c., on station platforms, possibly entitling them to compensation.

[13] Molesworth, p. 266, *Locomotive Repairs and Renewals:* Labour, 1·55*d.* per train mile; material, 1·75*d.* per train mile.

Full details, however, were given in the returns of the accidents on each railway, and there would be no difficulty in such cases in accurately apportioning these expenses, were such extreme refinement in the process necessary. Sir Courtenay Boyle was under a misapprehension in supposing that the particular figures he quoted from the table in the paper, relating to the maximum authorised "A" class rates per ton per mile were "mean" or average figures at all, or intended to be considered as such, the 19 pence referred to merely represented the total amount of the particular rate for a distance of 20 miles, the 42·5 and 50 pence similarly showing the total amounts of the rates for the respective distances of 50 and 100 miles. These amounts, however, were essential factors in the calculation for determining an average, inasmuch as the aggregate of the amounts for the given mileage in each case when divided by the aggregates of the respective mileages, gave 0·656 of a penny as the average or true "mean" rate per ton per mile of the several rates given in the schedule, which varied from 0·95 of a penny for 20 miles to 0·50 of a penny per ton per mile for a distance of 100 miles, the arithmetical mean, viz., 0·767 per ton per mile, being obviously incorrect. The object of the table was to show the relation which the average authorised maximum rates for the "A" class, bore to those at present charged by the London and North Western Company within the same limits of distance. It should be pointed out that in the case of the London and North Western the "A" class were given separately, whilst the "B and C" classes to which the Chairman referred, were in the case of nearly all the other principal railways grouped with the other higher classes of merchandise.

He particularly desired to draw attention to Diagram No. 5, which showed graphically and to scale the various London and North Western authorised maximum conveyance rates for different classes of merchandise other than minerals, and more especially to the upper and red scored dotted line showing to scale the average of all the authorised rates, viz., 1·79*d.* for the conveyance of a ton one mile within the limits of 150 miles, which, as already explained in the paper, was about the average "lead" of the goods traffic: the lower scored dotted line similarly showing the average rates at present charged by the London and North Western Company for all these classes of goods, including terminals, viz., 0·88 of a penny per ton per mile, the wide difference observable between the averages of the maximum authorised rates and those actually charged by this Company affording conclusive proof, if proof were needed, that, as in the case of the third class passenger traffic, it was from the lower classes of goods that this and most of the other principal railway companies in this country derived the great bulk of their paying revenue.

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